

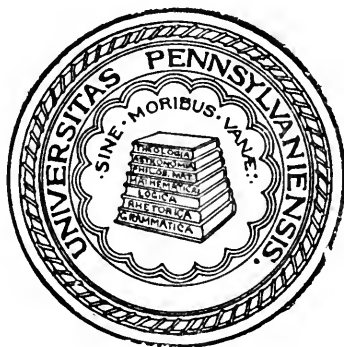
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PROCEEDINGS OF THE CORPORATION.

At a stated meeting held on October 4 the following business was transacted :

Resolutions of respect to the memory of the late Dr. William Pepper were adopted, and a committee consisting of Mr. Dickson, Dr. Mitchell, Dr. Furness, Mr. Harris and Mr. Rosengarten was appointed to arrange for a memorial service. Obituary notices were read of Dr. Simon Koppé and Francis Penn Steel, Jr., both of whom were lost on "La Bourgogne;" and of Dr. Lawrence Savery Smith, John Bell Scott and George Elliott, Jr., all of whom died in the volunteer service of the United States Army. Sympathy was extended to Dr. John Ashlurst, Jr., in his illness, and leave of absence was granted him for the period of one year. The Provost announced the bequest, by the late Colonel Joseph M. Bennett, of property valued at about five hundred thousand dollars, for the purposes of the higher education of women at the University. Announcement was also made of the striking of Locust street, between Thirty-third and Thirty-fourth streets, from the city plan. The resignations were received of Dr. Frederick Mann Page, Instructor in French, and of Dr. Robert Huey, Lecturer on Operative Dentistry. The appointment of Mr. S. P. Molenaer, as Instructor in French, was duly confirmed. The following changes were announced in the holdings of Fellowships and Scholarships in the Department of Philosophy (Graduate School)—Resignations: Mr. Burton Scott Easton, Harrison Scholar in Mathematics and Astronomy; Mr. B. F. Martin, University Scholar in English; Mr. L. W. Mattern, University Scholar in Chemistry, and Mr. Jesse Moore Greenman, Harrison Fellow in Botany. Appointments: Mr. Hartley Burr Alexander, Harrison Fellow in Philosophy; Mr. Joseph

Vincent Crowne, Harrison Fellow in English; Mr. Charles A. Gilchrist, University Scholar in Physics; Mr. Walker M. Levett, University Scholar in Semitics; and Messrs. Joseph H. James and Gilbert H. Boggs, University Scholars in Chemistry. The Alumnae Fellowship for Women (assigned for 1898-99 to Mathematics) was awarded to Miss Roxana Hayward Vivian. In the Department of Law, Mr. Francis Hermann Bohlen was appointed Lecturer on Law; Messrs. Owen J. Roberts and Roy W. White, Fellows; and Mr. George E. Nitzsche, Registrar and Bursar. Thanks were voted to Messrs. Carson, Griffith, Henry, Jones and Riter for their gift of a set of Stevens' "Facsimiles;" and also to the family of the late J. B. Lipincott for their gift of a marble bust of the deceased.

PHYSICAL EDUCATION IN THE UNIVERSITY.

Step by step with the broadening and modernizing of the curriculum, with the fading away of the dogma that the only comprehensive criterion of education is the amount of Latin and Greek more or less imperfectly assimilated, grows the conviction with American teachers that the body of the average youth stands in as urgent need of skilled training as the mind, if from a given number of the students committed to their charge are to be produced the largest percentage of persons capable of happily and usefully following the higher walks of citizenship. Within the last few years this has become almost axiomatic; yet the future historian of educational progress will have few facts to chronicle more far reaching and in some respects surprising than the universal and rapid adoption in our colleges of suitable means for instructing their students in the possibilities and limitations of the physical self, upon whose activities we are dependent for the expression of all effort.

Granted, then, that it is desirable to have a satisfactory system of caring for the physical instruction and needs of the students, just what form should this system take? Upon entering college every student of every department should be subjected to a thorough physical and medical examination. This should include not only the examination of the eyes, heart and lungs, but also a reasonably complete study of the blood and urine; sufficient at any rate to determine whether the person was anæmic, and whether the general metabolic and eliminative functions of the body appeared to be normal. If at this time any serious defect or disease were found of a nature to make the student's proposed course seem dangerous or unsuitable for him, he should not be permitted to enter upon it, but advised to take some other line of work. In the same manner he should be examined at intervals of one year, or in special cases oftener, during his stay at the University, in order to judge as well as may be whether his food, exercise, habits of study (light, position, etc.), and his hygienic relations in general are all such as to afford the best guarantee that he will fall a victim neither to his excessive striving after the good, nor to his lack of striving against the evil, which are both the necessary concomitants of student life in a great university. Few persons who have not been associated intimately for a number of years with the students of several departments would believe the number of despondent or reckless half hours to which they are liable, when forced by the severity of many of the courses to almost continuous hard mental application. Yet while overwork is the foundation of a great part of the sleeplessness and other evidences of nervous disturbance frequently found, such troubles would rarely become serious if the general conditions of life were more carefully regulated. This can be done only with the aid of the repeated physical examinations advocated. From them, and through the close personal relations so established

between the physical director and the student, can be learned the condition of each man and the dangers and difficulties to which he is subjected. It is then possible to remind him that "most of the troubles of life originate in the liver," and by words of friendly advice and encouragement to make him feel that the obstacles in his path have been met by others also.

This brings to our attention another step which should be made, namely, to require every student to take a prescribed amount and form of exercise in the gymnasium, or the gymnasium and athletic field combined; and this not, as is the accusation sometimes heard from non-academic circles, for the purpose of beautifying the man's figure, or to increase his usefulness on some team, but to improve his circulation and respiration, and with them the nutrition and metabolism of every cell of the body. Incidentally some disproportion or local muscular weakness may also be removed which previously handicapped the individual in the biological struggle. Requiring such work of students will not tend to subordinate in their minds intellectual attainment to physical perfection: pride in a healthy body is not incompatible with pride in a healthy mind; and it has been shown time after time, by the records of our athletes, that even men who devote a totally disproportionate amount of time to training are still, because of their fine physical condition, capable of holding creditable positions in their classes. A lithemic or dyspeptic, or one suffering from a sluggish liver or lack of red blood cells, will scarcely be able to do better work or more of it than his heartier fellow. Yet it is a matter of common experience that in every class, and usually near the top, will be found a group of hard-working, ill-looking students who by inherited disposition or material necessity are driven to works far exceeding their strength—reckless disbursements which threaten vital bankruptcy. Even if they succeed in avoiding a break-down during their course, they may still

be preparing themselves to swell the already too large ranks of American neurotics. It is because of such men that compulsory exercise becomes a necessity, but it should be required of all. Few are there who would not be benefited by it, and an effort to select certain cases as specially requiring it could not fail to be regarded as invidious.

Finally, together with encouraging athletics we must suppress all excesses in this direction. No student should be permitted to engage in any branch of sport without first proving that his physical condition is such that he will not be injured by it. He must then be required to proceed according to the graduated plan of the proper trainer, so that as the work becomes heavier his powers may keep pace with the increasing demands upon them. He should be re-examined from time to time to discover whether the work is proving too trying for him, and if this is found to be the case he should be obliged to give it up.

**ADDRESS BY THE PROVOST AT THE OPENING OF THE COLLEGE,
FRIDAY, SEPTEMBER 23, 1898.**

Gentlemen:—We meet, reinforced by the entering classes, in stirring times and under unusual circumstances. When the first Provost of the University conferred the University's degree upon its first graduating class, more than 140 years ago, he did so upon a little group of six young men, five of whom rendered eminent service to their country during the Revolutionary War. You may find the extraordinary history of the graduates of the class of 1757 in the annals of the University. I commend that record to each and every one of you. When the University conferred its degrees at the last commencement upon graduating classes which had increased from six to 504, our University circle was broken in many places by a renewed national service of professors, instructors and students alike. In not a single instance was I asked to use influence with

the authorities to secure for our men rank or position. Wherever a University man could serve, and serve well, whether as officer or private, there his duty found him. Not all who went have returned, or ever will return. Whether at home or in the distant East, or in the islands of the South, University of Pennsylvania men have been found standing by one another and rendering intelligent service in a new cause of freedom.

While thus the light of service well rendered has illumined a new page in the history of the University, a shadow has been cast over it, and the city itself, by the death—in the prime of life—of one of our group, a member of the class of '62—the late Provost, William Pepper—a man richly gifted, always ready to help, untiring in professional and in civic life. We shall all cherish the memory of the honors which he won, and of the benefits which he conferred on his fellow-men, in the strenuous labors of a fruitful life. He had lived his four-score years at the age of fifty-five. His motto was "Rest elsewhere."

I have said that we meet to-day surrounded by stirring events and under unusual circumstances. We find our own beloved country confronted with new and difficult problems to solve, standing at the parting of the ways, so anxious as to which of the two roads to take that an agreement as to the national duty is far from having been reached, and there appears to be no consensus of opinion on the part of the most thoughtful and conscientious and devoted of our citizens. Mingle with any large group of men, as the convention which met recently at Saratoga—and you will not find unison of opinion. Consult the most thoughtful and serious of our public journals, and you will find views absolutely in contrast one to the other. So far as the most distant and most serious of the problems is concerned, we can only say that there is almost a universal agreement to give the nation the benefit of time for consideration, and for individual opinion to form and express

itself; so that at the last the opinions of the greater end of the smaller number may have definite expression.

In addition to these questions, which so vitally concern the future and the welfare of our own country, we have come to a time when such changes are taking place over the face of the whole world as must needs make every adult person watch the daily awakening with intensest interest. We see Russia—so long checked in her natural wish for an outlet at the West and South—moving with the resistless force of a glacier—to keep her mastery in the distant East, to her; in the distant West, to us—over thousands of miles of habitable country in a temperate zone. We see the “Dark and Unknown Continent” so rapidly disclosing that the city of Khartoum, which has taken more than thirteen years for an armed force to reach, is now within nine days of the city of London. We see the population of India, under the safe rule of England, increasing so rapidly as to make the care of that population one of the additional, and almost unforeseen, responsibilities of our kinsmen. We see the oldest and most thickly inhabited part of the globe, hitherto surrounded by its Chinese wall of exclusion, rapidly “vivisected” and about to be controlled by the four or five great powers of Europe.

We are drawing near to the end of a century which has been without a rival in the discovery and uncovering of the hidden places of the world, in the advancement of knowledge and in the amelioration of the condition of great masses of population. We have come to the end of a century, too, when we rejoice in being able to say with full knowledge that the universities of this country, in common with the universities of the world, are looked up to with greater respect, with greater confidence, and by greater numbers of people, for guidance and direction than has ever hitherto been the case.

You have come, some of you for the first time, and others not for the first time—to one of the great seats of

learning. Here every incentive to a broad and deep and generous life surrounds you. No group of young men ever had more full and wholesome and ample provision. The enrichment of the treasures of literature, the precision of the exact studies, the training of the powers of observation, through the natural sciences, the broadening result of philosophical methods—all these cannot but have their seen and hidden influences in forming that complex result—the character of each one of you. And, besides all this, and almost equal to it all in its permanent result, is the contact of each one with two or three thousand others, all living their four years of life here; all working for a result, and all contributing in one way or another to the sum total of the life of the University.

I am entirely sure, from observation and experience, that you will be held accountable—that each one of you will hold himself accountable—for the results of these brief years which you are living at the University of Pennsylvania. Let no element of selfishness or inertness have any lodgment here. Be up and alert and doing—now while the blood courses so rapidly through your veins; while hope looks brightest—even though the struggle of many of you be very sharp. Get all that you can out of these university days. Take an interest not only in your friendships and in your university work; but take an interest in what concerns the city, the State, the nation and the history of the entire globe. Think of large questions and discuss them, in your walks, at the Houston Club, at the Debating Union, and in your rooms of residence at the dormitories. Make every day count. There is plenty of time for all—for hard work, for healthful exercise, for sound and dreamless sleep—each one of you has all the time that there is. Remember Emerson's "Give me Health and a Day."

So I am sure that you will help to make the University of Pennsylvania, of which you are a part, and which is a part of your own life, a national and world-wide power.

And if there be one quality over another which ought to distinguish a University man, as a result of the life which he leads and the studies which he follows, it should be the quality of truthfulness. The work of science in this century of progress has been not merely the ascertainment of truth, but in an equal and parallel degree, the destruction of falsehoods. One of its first duties was to provide itself with exactly correct weights and measures. Its first demand is that these be exactly applied. Its votaries must learn to apply them diligently, at any cost or pains, exactly and honestly; for all the labor of investigation is thrown away if there be a taint of dishonesty or untruthfulness in any standard or any process.

It is this that gives a moral quality to University life in these days, so that the really successful student has done more than to master his selected course and to win a degree. He has developed a personal fibre that will persist through life, and tell in every part of life, and be a "character"—a distinguishing mark of the man. So that, if you will take a parting word from me, I would like this great quality—the greatest of all in my judgment—the quality of absolute telling of the truth, to be the distinctive quality of the University of Pennsylvania, so that no matter where any one of us may ever be, either here or elsewhere, or upon whatsoever shores the waves of the sea may beat—whatever we may say, to the best of our knowledge and belief, may be taken by everyone and under all circumstances as the truth, because it was spoken by a University of Pennsylvania man.

**ADDRESS BY THE PROVOST AT THE OPENING OF THE MEDICAL
AND ALLIED SCHOOLS, SATURDAY, OCTOBER 1, 1898.**

Gentlemen :—I need hardly repeat, in very formal terms, the heartfelt welcome with which the Faculties of Medicine, Dentistry and Veterinary Medicine greet the students

of these University departments and allied schools, at the beginning of a new academic year. As the sole professional object—outside of his own personal growth—of each member of these faculties is the service which he may render to you, through the instrumentalities which the University furnishes, and through his own increase in ability as a scientific man and as a teacher, we may speak to you with more certainty and expectation, if we may feel that the University is doing its part, and that each one of its teachers is doing his part, toward the fulfillment of the serious duty which is owing to each one of our students. Not only every student, but every professor in the University, must appear before the forum of his own conscience, as well as before the judgment of his fellows, to ascertain how far this great obligation has been duly rendered. The University itself, as a great living—if intangible—force, is certainly able to say that if it may not realize all its purposes as rapidly as those who watch over it so eagerly long for and desire, it yet makes every year significant progress in the interest of all those who come to its halls. It has entered upon a career, caring not so much for numbers—whether in these or in other departments—as for the character and quality of the student graduated. We may not expect an increase—we rather look for some decrease—in the number of our students, upon the plans which we have laid out for ourselves. That we shall win in the end, not only in the standing of the men who will receive our diploma, but in the respect and confidence of the community, and at the last, in very great increase in numbers, is to my mind entirely sure. Therefore the increasing requirements in our entrance examinations, both here and elsewhere; the absolute impartiality of the treatment which each student will receive in his term marks, and the honesty of the exit examination, are to be without a flaw, so far as human intention and fairness are concerned.

That these purposes are already respected and encouraged

by this community is evidenced by the fact that during the past four years more contributions in money—if that may be taken as an evidence—have been received and expended here than in the whole 140 years of the University's previous history. The successful and useful result of this intention to disregard numbers and to work for the highest good of the individual student comes out, from time to time, in many interesting ways. For example, it is an arithmetical fact, and an analysis of the recent examination before the State Board of Medical Examiners of Pennsylvania shows, that but one student graduated from the Department of Medicine of the University of Pennsylvania failed to pass the examination of the State Medical Examining Board; and as ninety-three University of Pennsylvania men presented themselves, this means a percentage of rejection of less than one. Further, the general average of the whole body of the ninety-three students examined was so much higher than that of any others who presented themselves as to stand in a class entirely by itself.

I have referred within a few days—at the opening of the College—to the unusual conditions which surround us upon this occasion, and to no body of men are many of these circumstances more interesting than to yourselves. I need not go into the question of the conduct of the war. Everyone knows that to the friends of those who have been in the service of the government, disease has had its terrors far in excess of death or wound in battle. The lessons to be learned, and which will be learned, have only been branded into us with suffering and anxiety for those for whom we had not learned these lessons in time to be of service. But there is one great fact to which I want to call your attention, and one which I do not think the public has generally observed. It is a fact important not only as having a bearing on health, but important as being a witness to the debt which the civilized world owes to the universities of the world in the responsibility assumed by

them, and practically committed to them for the conditions of life, as far as health and immunity from disease are concerned. Will anyone say that ever in the history of the world there has been done what has just been done in these United States of America; that the army of the United States at Santiago de Cuba, one of the fever-infected ports of the world—the army itself being infected with contagious disease in several forms—has been bodily brought from Santiago de Cuba to a point in juxtaposition to one of the most thickly settled centres of population in the world, and from there dispersed to every part of this country—with entire safety and immunity? Is not this to be considered a greater triumph than any one of the victories of the war? What great and generous response may we not expect from a grateful nation, not only for what the hospitals have done, and notably the hospital of the University of Pennsylvania, but for what has been done through the advancement of knowledge, to have accomplished such an epoch in human history as that which I now wish to record?

I wish to refer, for a few moments, to matters which more immediately concern our home circle. Since the close of the last session the University has sustained a serious loss in the death of Dr. William Pepper, Professor of the Theory and Practice of Medicine, who for a number of years held also the Provostship of the University, and in many ways did much to promote its prosperity. This is not the time or place in which to allude to Dr. Pepper's labors as the Provost of the University. I will here only speak of his brilliant career as a practitioner and teacher of medicine. An alumnus of this department, he displayed from the outset a decided talent, especially as a diagnostician, and this he developed by the closest attention and diligent study in the Pennsylvania Hospital; afterward in our own, and in the large private and consulting practice which he gradually but surely built up. Clear in his con-

ceptions, and with an admirable skill in giving verbal expression to his thoughts, he became a rarely effective lecturer and clinical instructor, and his large classes followed with pleasure and profit his teaching in this important Chair. I call your attention to the illustrious men who have occupied the Chair of the Theory and Practice of Medicine since 1765; namely, Morgan, Kuhn, Rush, Chapman, Wood, the elder Pepper, and Stille.

In addition to this University loss, through the death of Dr. Pepper, the Department of Medicine and the University itself are called upon to endure the shock of the death of two of our number who have given up their lives since Commencement Day, in the service of their country. We all desire to recognize the high personal character and professional ability of Dr. Lawrence S. Smith, Instructor in Clinical Gynæcology. Dr. Smith served as surgeon of the 1st Regiment Pennsylvania Volunteers. He was taken down with fever in Porto Rico, and died on the steamship "Relief" while on his way home.

Professors and students of all departments will long remember Mr. John B. Scott, a third-year student in medicine and the president of the Houston Club. He, also, died through disease contracted while in the service of the government. If there was one quality which distinguished him above his fellows, it was that great purpose of his life, to serve every student of the University in need of moral help. These are no perfunctory words of speaking nothing but good of those who are deceased; but they are words of truth and soberness, when I so speak of Dr. Lawrence S. Smith and Mr. John B. Scott.

Not only has death been conspicuously busy in this professional school, but grave and serious illness has not omitted its ministration. Though slowly recovering from his attack, the senior Professor in Surgery of the Medical Faculty, Dr. John Ashhurst, Jr., still lies at his home, after two months of helplessness, unable to be with us to-day except

in thought. Our expressions of confidence, of respect and sympathy have already gone out to him, and again go out to him to-day, from one and all of us, with our heartfelt wishes for a due restoration to health and to his presence again amongst us as of old.

It will not do to speak of the University's purpose to disregard numbers, but to look solely to the character and quality of the student graduated, and omit the expression of its intention to provide every scientific and literary opportunity for the medical students of this University. I have already said more than once that when I entered the service of the University it was with the clear apprehension upon my part that several years must elapse before I could undertake the question of the highest and best equipment for the Medical School. Many other departments needed immediate care. The daily life of the students of the University had to be provided for through Houston Hall and through the dormitories. It was necessary to fulfill many obligations of the University to its dental students, who had no home of their own ; to its students of law, who have also hitherto been without a Law School building, and in many other ways to make such quick provision for immediate University requirements, that it is only now that I have been able to feel free to give the major part of my time to the interests of the Department of Medicine. I am able to announce to-day that the first great question to which the Trustees of the University will direct their attention will be the erection of new medical laboratories. I do not mean a postponed consideration of the question, but an immediate one, so that just as soon as the plans may be most carefully and thoroughly studied and matured we will proceed to the erection of great medical laboratories for the strictly "medical" laboratory work—that in pathology, physiology, and pharmacology ; laboratories I mean of sufficient size to give room for individual student work in our large classes, and such other room as may be needed for the

prosecution of research work by our professors and graduate students. Such a building will have to be fully equipped with the most modern apparatus for individual work. This may seem to be a large demand, but it is one which is now to be filled. Certainly, with the high credit which our Medical Department has had; with its noble history; with the thousands of graduates who represent it in every corner of the land; with the great public influence which they have, the provision of this great need for the Medical Department is to be a pleasant and happy task.

Indeed, gentlemen, it only needs the same spirit to animate us in our University work which has animated all those who have had great causes at heart, and have accomplished, because they have had them at heart. A few days ago I read in a London journal a review of the work of John Hunter, written by Stephen Paget, and it seemed to me that if we could, one and all, be stimulated by the same spirit which animated him there is nothing in connection with medical education, investigation and research at the University of Pennsylvania which we could not accomplish; his whole heart and soul were in his profession. "He worked incessantly, and allowed no suffering of his own to abate his endeavors. The more that ignorance and hostility sought to baffle him, the harder he worked. To lose any opportunity for useful experiment was to him nothing short of a crime. Upon one occasion, where a man had died of an obscure disease, he sought most earnestly to get permission to make a post-mortem examination." No influence or persuasion of his could remove the objections of the relative whose consent was needed, and when at length he was finally defeated in his purpose, he retorted with all the vigor of his nature: "Well, I hope that you and your family and all your friends will die of the same disease and that there will be nobody at hand to bring you relief."

We admit that professional zeal seemed in this case to

overbear the charity that "endureth all things;" but we must remember that this zeal was for a grander charity, that strove and hoped for means to avert this suffering and death from all who were in peril of it.

So, gentlemen, let us each, in his proper sphere, take up bravely, seriously, hopefully, the work of the session that begins to-day. I have my task before me; each of you has yours. And may we all so do our part, and the Divine blessing so rest upon our doings that when the session ends we may thankfully look back and feel that it was indeed fruitful, both for ourselves and our Alma Mater.

**ADDRESS BY DR. WILLIAM A. LAMBERTON AT THE OPENING OF THE
DEPARTMENT OF PHILOSOPHY, SATURDAY, OCTOBER 1, 1898.**

In presenting me to you the Dean has kindly intimated that the exercises of to-day are to be looked upon as quite informal, and yet he has given to my proposed remarks the title of an "address," which bespeaks for them apparently a greater degree of formality than justly should attach to them. I prefer that they should be looked upon as remarks that have been suggested by events of recent occurrence, but thrown into shape under circumstances that precluded anything approaching elaboration.

Yesterday the Dean, meeting me in the halls, told me that pressure of other engagements would make it impossible for the Provost to prepare an opening address. I then consented, in default of a better, to fill up the time that had been reserved for the hoped-for address from our Provost. These words of explanation I conceive are due to the Dean, to myself, and to you.

The topic I have thought of touching upon is one that is naturally suggested by the circumstances of the time and the events of the past few months. That it is a subject appropriate to such an occasion and place as this I

think all will admit. The topic may be stated briefly as "The Scholar in Political Questions."

Probably the strongest and often the most dangerous temptation the scholar is subjected to is that of isolation. We are all apt, in the feverish desire not only to keep abreast of scientific thought, but also to add something ever so little of our own to the already acquired stores of scholarship, to confine our thoughts over-strictly to the single sphere of work within which our talents and our likings have placed us. We feel, or think we feel, that here lies our work, and that every moment, every effort subtracted from our specialty, is a kind of desertion of our post. The matter is not improved, it is rather aggravated, by the annual meetings (proper and important as they are) of fellow workers in various associations for the promotion of science and scholarship. Our associations at these meetings are mostly with men whose lines of work and thought are, even in their very narrow limits, the same as our own; even within the associations themselves we are most likely to pick out for acquaintance and companionship those who belong particularly to our own subdivision of work. These tendencies, however productive of intensity and consequent effectiveness of application to our immediate studies, cannot fail to have a narrowing and (if I may be allowed to say so) an illiberalizing or deliberalizing effect upon ourselves; and, what is more important yet, they tend to prevent our filling our proper place in the community at large and contributing our due part to its progress and welfare. It is not good for man to be alone, either individually, or (if I may say so) scientifically. Each man was made to be a fellow in the society of men around him, and science as well is not intended to be an isolated thing, an end in itself, but as one of a bundle of influences whose issue is for the general good. No amount of devotion to science can absolve us from our duties to the community about us, or justify us in shutting our minds and hearts to more general

interests in which, whether we will or no, we must have a share.

These thoughts are particularly forced upon us at the present moment, as the result of the events of the past summer; events which it is not necessary I should either describe or characterize—they are familiar to you all,—we find our country come to a most important crisis in its history. We have come, as the phrase goes, to “the parting of the ways.” The question is placed before the nation for decision, a decision that will not be put off or shuffled over, as to whether we are to continue in the policy of the past, devoting ourselves solely to the development of our internal resources and the improvement of our own system of policy at home, seeking for no influence upon the other peoples of the world except in the quiet and unobtrusive way of an example, nobly conceived and, if possible, as nobly realized: or are to say to ourselves, our policy hitherto has been proper enough for a nation in swaddling clothes, but now we are grown to the full stature of a mature people, and the very extent our resources and growth of our power impose upon us a duty which we may not forego, of entering actively in the struggle to promote civilization and enlightenment in all parts of the earth; we must not be satisfied with keeping our torch alight at home, we must carry it abroad into the dark places of the earth, while our mission at home must not be neglected; we have reached the stage when “foreign missions” become imperative upon us. I shall not discuss this question; I merely wish to call your attention to it and to its momentous character. For you will easily see that the decision of this question is not a small matter: it carries necessarily with it a world of untold and undreamed of consequences in the future. If we once take this step that now is before us, we may not easily draw back, we probably will have to go on, and who shall say whither this path will lead us? Will it really in the best way promote our mission to the peoples of the earth?

or will it be a desertion, under specious semblance of advance, of the high duty we have hitherto conceived to be our own? Will our salt lose its savor?

Who can doubt that in presence of a question like this our country has need of all the best brains it possesses, that it may find a wise, judicious solution of the problem circumstances have set before it! Can you, who have been and are devoting your time and energies to acquiring the scientific method of attacking questions, in the line of your chosen fields of study, safely or properly regard with indifference the settlement of a question which involves so much for your country and for yourselves? Surely not. And yet, although this question is striking enough to be quite startling, now that it is put nakedly before us, do not let us forget that, after all, it is simply the natural outgrowth of our recent history; each of the questions that marked the various stages of its approach was, compared with it, a small one, and in each of them, I think, it will be found that the decision that was made, was made without any careful or adequate weighing of the possible ultimate issues involved.

The gravity of the present crisis but emphasizes the call that is made upon us. The same call is daily made.

It is a call, observe, we cannot shirk. We have each of us to make a personal decision upon these questions. We may make it by the blind casting of the vote, or by an equally blind and futile refusal to vote, but make it in some way we must, as things are constituted in our land. Now how shall we, how ought we, to act? We claim to be men of enlightened minds; men who, each in his own field, in his own way, and to the degree made possible by his own capacity, are initiated, or in the way of initiation, into proper scientific method. As such, as all that we are and claim to be, this duty calls us. We are to come to the performance of it, precisely as everybody must do, not with a curiously differentiated portion of ourselves, which may

be called our political part, but with our whole selves, with our abilities native and acquired, with all the invaluable mental capacities and aptitudes incident to our training. The one thing that we all have in common, no matter in how many different directions our special application of it may lie, is the scientific habit of careful search after the facts, skillful appreciation of these facts when discovered, careful arrangement of them each in its appropriate place according to its nature and importance; and last of all a cautious summing up of them all into the final result, with an estimate, that shall be as far removed as possible from a mere guess, as to the true meaning and bearing of that result. This is the one thing that gives us what special value we have; this is the one thing that above all others we should carry into our attitude and action in questions affecting the State. If passion, with its sentimental but thoughtless enthusiasms that sweep us to-day here, and to-morrow with an equally irresistible reflex in quite an opposite direction, is out of place in questions of abstract scientific investigation, how much more where vital interests of numbers of our fellow citizens are immediately at stake? Here, if anywhere, it should seem, the only passion admissible is the noble enthusiasm for the true and the right. Of course, I need not be told, we too have personal interests at stake, and the personal (*i. e.* the potentially passionate) element is harder to repress here than it is in a question of physics or of mathematics; but that only means that we are on all sides surrounded by human limitations; that, do our best, we are still liable to be led astray: it does not absolve us from the obligation to do our best. We may err, we will certainly err at times, but our errors will be, as nearly as may be, involuntary; and other things being equal, the effort to do right will more than compensate for the deflections of our mind's compass.

It may be said, too, that political questions are becoming more and more questions for experts, and our field of infor-

mation and thought is so remote from these that such effort must necessarily be abortive; but, so long as we are "political beings," we have no right to allow such questions to become utterly incomprehensible to ourselves; the simple elements at least we should have at command, and when deeper questions are stirred, we must do just what we do in our specialties when we need to gather quickly for their purposes guidance from other fields: we must go to the experts in those fields and seek their help, not merely that we may know certain results, but that we may as completely as possible gather the process of their thought and the meaning of their results for ourselves. And, if it be said again, this will take time, and we have no time to spare from our favorite study, my reply is, we live in a country where certain time for the consideration of public questions is demanded of us; it is part of the price we are to pay for the great privileges we enjoy. As we must take time, to eat, exercise and sleep, or depart from the world of animal existence, so we must take time for this, or give up our claim to be living as rational creatures under a government of the people, for the people, and by the people.

We are apt to hear the cry raised at times of momentary political degeneracy and corruption, that scholarly, educated minds are needed in politics to redeem our country from the disgraces that are threatening. But there is a better, because more normal, use for the scholar in politics, than to make him an occasional disinfecting agent: let him make of himself a permanent leaven of thoughtful action at all times.

ADDRESS BY DEAN LEWIS AT THE OPENING OF THE DEPARTMENT OF LAW, SATURDAY, OCTOBER 1, 1898.

In the absence of the Provost, who in alternate years opens the Medical Department of the University, it becomes my pleasant duty to welcome the old and new

students of this department. We are glad to see every one of you. We especially welcome those who left us last spring in response to their country's call. The Law Department has been more fortunate than some other departments of the University, for while we gave not a few to the war, and while all have not returned, none have been lost. It was not every one's duty to go to war, and yet I think we can truthfully say to those that went: You have done the full measure of your duty. Whatever your life may be, it will be accounted for you in the end that once, at least, willingly you gave all you had—you gave yourself freely to the service of others—to the service of your native land.

I desire to take this opportunity to say a few words concerning the work of the coming year; and first in reference to the Library. Those of you who have been with us before will notice that we have made certain changes in this room. One result of these changes is that we expect to give all books out on cards instead of simply the text books. Personally I regret that this means you will not any longer have direct access to the reports, and yet I have felt for some time that certain evils which appeared necessarily to attend our old system had begun to outweigh the advantage to the student of direct access to the reports. As the number of those who use the library increased, the confusion incident on each man hunting his own books was productive of considerable noise. Then too, it enabled one man to secure at one time, even though he could not use them, all the books cited by one professor for the next hour. It may be that the system which we have now adopted will be productive of other and still greater evils; but I think we are all interested in securing the adoption in the end of a system which will make this library as useful and convenient as possible to all of us. I therefore ask you to co-operate with the library authorities in giving the new system a full and fair trial.

The members of the incoming class will, as always, have some difficulty in ascertaining the books they should call for in the different courses, and the portions of the cases cited by the professors which it is necessary for them to read. Any difficulty of this kind can be solved by the Librarian, and there should be no hesitation in asking questions.

Last year has seen an increase of over six thousand volumes in our library. The University is spending thousands of dollars a year in the purchase of law books; friends of the University last year presented us with books and money to the amount of nearly eight thousand dollars. To make this collection, which is one of the most valuable in the United States, really available for the professor and for the student, it is necessary that this room should be kept as quiet as possible. Those of you who have been with us in the past I know fully realize this, and I simply take this opportunity of impressing upon the incoming class the fact that this room is a common study for the entire department, professors and students; and in order that all may profitably use it, each has to make a conscious effort to be as quiet as may be.

In regard to the course of the last two years, as many of you have already seen by the elective sheets, the subjects of the third year have been considerably increased. We have added a course on Municipal Corporations, a course on the Constitution and Statutes of Pennsylvania, intended, of course, only for those who expect to practice in the State; a course on Damages; a course on Negligence; and a course on Conflict of Laws, or Private International Law. It may be interesting to note that there is more instruction offered to the present third year class than six years ago was given in the entire three years.

Your election is, as heretofore, subject to the approval of the Advisory Committee. I am often asked as to what this committee regards as a necessary elective. I should

like now to say that there is no one thing which it is necessary to take in any one of the two years. It is rather the combination than particular subjects at which the committee look. If there is any exception to this, it is the subject of Evidence, which, if not taken in the second year, should, unless there was special reason to the contrary, be elected during the third year. Your group of electives should not show too great a preponderance of any one class of subjects, nor should it omit one class altogether. For instance, a certain number of the Property, Contract, Commercial Law, and Equity courses should be elected, but it is not necessary to elect all the Contract courses, all the Property courses, or all the Equity courses. I should advise each one of you to attend as many of the first hours in each subject as possible, when the nature of the problems to be covered in the course will be explained by the professor. You can then make your election with greater knowledge than you now possess.

You will notice that mid-winter examinations have been abolished, and that the examination dates in the May period are already published. It is proper that the reasons for these changes should be explained. We recognize that there was some disadvantage to a man taking a course which stopped in February on which he was not examined until May. It, indeed, would hardly be wise for one to elect more than one or possibly two of such courses. At the same time, you must not exaggerate the difficulty. Merely extending the examination in one half-year subject for a few months, if you have one or two days to review the subject before taking the examination, does not present much difficulty. Our reason for abolishing the January period was the fact that we needed the week in the course. Many of the two hour courses which run through the year have not as much time devoted to them as is necessary. The Faculty were therefore confronted with the necessity of opening the department a week earlier, or even two weeks

earlier, or abolishing the January period. In view of the climatic conditions in this part of the country at the end of September, I think you will appreciate our desire to retain our present date for opening the department. The same reason led us to fix the examination dates. We are under the necessity of placing all the examinations in the third year after the fifteenth of May. This obliges us to give an examination each day from May 15 to June 1. By determining in advance the examination dates, you are able to avoid taking a combination of subjects which would bring three or more examinations on successive days. You will notice on looking at the schedule that there are one, two or three days between all the full two hour courses, that is, practically all the fundamental courses.

The system of quizzing will be repeated to the first year class and extended to the second year. Before this quiz system was adopted many of our students hired outsiders to quiz them over the work of their course. It seemed to us that the University ought to be in the position of saying to each student: "Any help you want in your work here we stand ready to give." The election of Mr. William E. Mikell as instructor to the first year class was the practical result of this thought. As you will see by the notices which will be distributed at the desk we have made certain radical changes in the system as adopted last year. The whole is now on a purely voluntary basis. A student who does not want to enter a quiz section need not do so. Last year we found considerable difficulty in dealing with men of different mental calibre in the same section. The more advanced man was kept back by the slower man. I should therefore advise those who intend to avail themselves of the opportunity offered by the quiz to as far as possible form themselves into a group with others of their acquaintance. Those who are unable to do this will be placed by the quiz-master in a section with others requiring the same quantity and kind of instruction.

To members of the incoming class I should like to say that we are glad to see all who come to us with a serious intent to give to the science of law their undivided attention. You have heard that the law is a "jealous mistress." That may be true, but it is certainly true that the Law Faculty of the University of Pennsylvania are jealous of their students' time. We do not pretend that your course here, and especially your first year here, is easy. On the contrary, we know that it is hard. There is no reason why those of you who come to us with good mental preparation, who are willing to work hard, who have an aptitude for the law, and fairly good physical health, will not succeed ; but those of you who lack any of these attributes are necessarily entering a contest in which the chances are against you. By our entrance requirements we try to eliminate the man who on the average, even if he worked hard, will fail ; but we heartily welcome those who have all the qualities indicated, because we believe that we have here something to give them, something of legal learning and legal mental training, and perchance of character, which will stand him in good stead all through his professional life.

What I have said I have said for the University and the Law Faculty. In conclusion I want to say a word for myself. I want each one of you to feel that you can always come to me and discuss two subjects at least, with entire freedom—the Law School and its administration, and yourselves, your present difficulties and your future prospects. I know, from past experience, that I shall gain good from the first and I hope that you will occasionally gain some benefit from the second. It is not a simple thing to administer a large professional school. I need your help. Should you need mine I assure you I shall freely give it. I wish you all a prosperous year, fruitful in the solution of many legal problems.

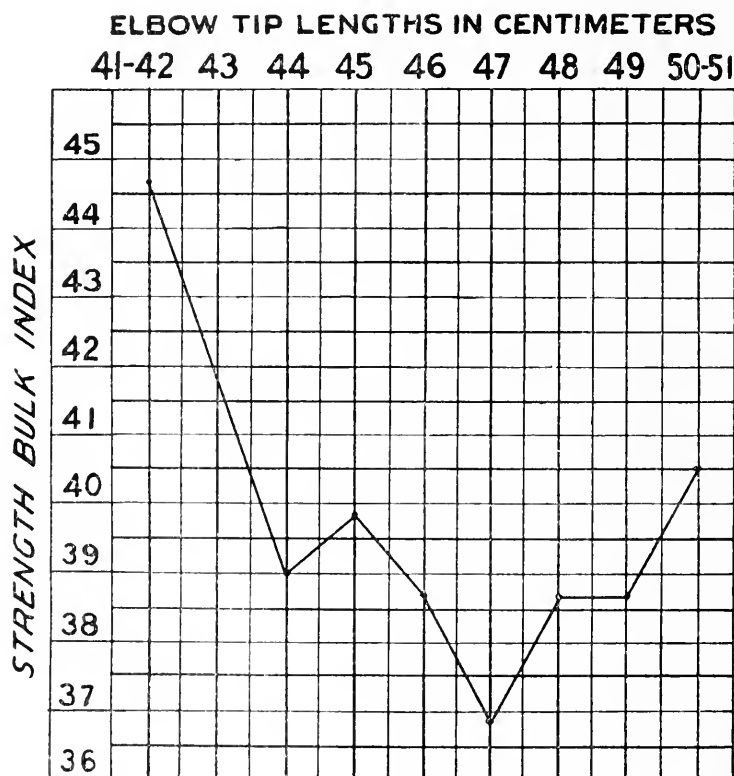
LENGTH AND STRENGTH IN THE FORE-ARM.

The following experiments were undertaken in order to study the specific strength of the flexor muscles in connection with varying lengths of the fore-arm. By specific strength is here meant strength per unit size, which is, of course, found by dividing the total strength by the number of units of bulk. Obviously, in order to determine whether length, *per se*, has any influence on strength we must deal with specific strengths rather than total strengths, since a long arm is usually absolutely larger than a short one. That the total strength of the hand flexors of tall men is greater than that of short men has already been demonstrated, but this by no means proves that the specific strength is also greater.

The method of operating was as follows: After taking the elbow-tip length, the arm was immersed in a tall cylindrical vessel provided with a spout. Before placing the arm in the vessel it was filled with filtered water level with the spout, so that as soon as the subject placed his fingers in it the water commenced to run out, and continued to escape until the subject ceased to push his arm farther down, which was not until the surface of the water touched the tip of his olecranon. The water so displaced measured the bulk of the hand and fore-arm, and was caught in a counterbalanced vessel standing on the platform of a special scale. The weight of this water in grams represented with sufficient accuracy the bulk displaced in cubic centimeters. By dividing the total strength as read from the dynamometer, expressed in grams, by the bulk expressed in c. c., we get the specific strength or *Strength-bulk Index*, which is to the arm what the strength-weight index is to the entire body. To this plan it may be objected that we really measure something very different from the bulk of the flexor muscles, namely, that of the entire fore-arm and hand. But it is reasonable to suppose that the bulks of the different muscles, bones, etc., maintain the same average proportions for various absolute sizes, just as we do not hesitate to compare the strength-weight indexes of several individuals, although we have to assume that the proportion of muscular and non-muscular elements remains constant for persons of different

weight. Neither index tells us the actual strength of the unit of muscle (which must always be much greater than the index), but in them we have a convenient measure of its relative strength.

The average strength-bulk index, derived in the manner described, is plotted for each length of fore-arm in the following



curve. The number of experiments was one hundred and thirty-three, on students from various classes and departments of the University. The elbow-tip lengths encountered all fell between 41 and 51 centimeters. Most of the results fell between 43 and 49, both included, so that the averages over this range are given divided to single centimeters. Between 41 and 42.9 only five are recorded, and between 50 and 51.9 only seven;

therefore, these two groups are not subdivided, and each occupies only one position on the chart. It will be understood that in each case all the elbow-tip lengths falling between the figure at the head of a column and that at the head of the next are included under the first; thus, in the column marked 43 are included all measures of 43 and above up to and including 43.9, and so on for each of the other columns. It will be seen that the curve so formed is lowest at the elbow-tip length 47, and from this point shows a general tendency to rise toward each end, although this tendency is more marked for short than long arms. In other words the curve would indicate that short arms are specifically the strongest, long arms the next strongest, and those of medium length the weakest.

The reason for these results is not very clear, but the following explanation is suggested as probably correct. It is hardly to be supposed that the real unit strength and accordingly the intimate structure of muscle varies in the manner indicated by the curve. In fact, it is in any case very generally admitted that what we measure by the dynamometer is not the strength of a muscle, but rather the force of the nerve impulse sent to it, since suitable artificial stimulants are capable of producing more powerful contraction than can be caused by the unaided will. Now short arms generally belong to smaller men than long arms. But small men are more alert than large ones,—their nervous energy is more promptly available, and it would seem more skillfully applied,—their inertia both mental and physical is less. The essential nature of the dynamometer test is a quick, sharp contraction applied to an instrument for the most part unfamiliar to the subject. Here, then, are the conditions favoring the smaller individual, the kind of effort is that in which he excels, and he learns more quickly how to get the best results from application of his strength in work that is new to him. The short arm occupies a favorable position on the chart not because it is intrinsically stronger, but because it is driven harder and more effectively. But if this be true, the curve should continually fall from beginning to end,—there should be no rise after 47. And neither would there be if we had a perfect dynamometer, that is, one which would fit the hand properly and have no appreciable movement when the

subject exercised his strength. But the fact is that with the ordinary spring instrument the fingers are moving throughout the test, so that even if its size and shape be such that it can be placed in the hand so as to give the most advantageous flexion of the fingers at the beginning of the trial, still near the end, which is exactly the point when the greatest demand for power is made, the relation of the fore-arm to the fingers, and of the latter to the spring will have changed so that the full force can no longer be realized. As soon as the resultant of compression of the fingers fails to correspond with the axis of resistance of the spring some of the force must be used up to neutralize the new resultant produced by this discrepancy, which tends to rotate the spring on its long axis and so cause it to slip either toward the palm or the ends of the fingers. Even after sacrificing part of his strength in this effort to keep the dynamometer from slipping the subject is not always successful, as is shown when the instrument is squeezed entirely out of his hand and dropped, or more frequently by the complaint "I could have done better if it hadn't slipped." If this difficulty were constant for different lengths of fore-arm it would not influence their comparative efficiency. But it is evident that in order to compress the spring a given distance short fingers will have to bend through a greater angle than long, short flexor muscles will have to contract a greater percentage of their total range than long ones,—in fact, the whole situation will have changed more at the end of the trial for a short arm than for a long one, and the mechanical handicap will grow less as the arm grows longer.

On the above hypothesis the determination of the different values composing the curve is dependent upon two opposing factors; the first predominates until 47 is reached, when the second overbalances it, and causes the curve to rise. Its irregularities may be due to the small number of observations, which while showing clearly the general direction it follows are too few for accurate quantitative results. This difficulty the writer hopes to remove by continuing his experiments.

CASPAR W. MILLER.

NOTES.**The Library.**

During the summer months many changes in the interior arrangements of the Library and various changes in the library method have been introduced with a view to increasing the usefulness of the collections. The large reading-room has been divided into two sections. In the outer reading-room the periodicals and periodical publications of societies and learned institutions at present received in the Library will be on file. Much care has been bestowed during the past few years in increasing the list, which now numbers over 900 journals and periodical publications. In the last UNIVERSITY BULLETIN a complete list of these periodicals (with the exception of the Medical) will be found. Additions will be made and notice given. During the past six months, efforts have been made to complete the files of periodicals, and this work is still going on with every prospect that most of the gaps will be filled.

Separated from the outer reading-room by a glass partition, an inner room has been fitted up with eighty-seven desks for the use of readers. There will be room for thirty-six more readers in the alcoves. The desks and the seats at the tables in the alcoves will be numbered. A special assistant will be in attendance in this inner room, through whom books can be brought directly to the readers, and the assistant will, also, take charge of books which readers desire to have kept for them. The six alcoves opening out of this inner room have been arranged as a Reference Library. The various subjects have been apportioned among the alcoves to meet the convenience of students; thus, one alcove will contain reference books on English Language, Literature, Anglo-Saxon and Rhetoric; another, Political Science, Political Economy, Administration, Finance, Transportation, Sociology and Statistics, etc. In all, about 10,000 works will be found in these alcoves. These works have been chosen by the professors or instructors in charge of these studies. In making the choice, the aim has been to select such books as the persons working in any particular subject would like to have around them. Along the walls of the inner

reading-room, Cyclopædias, Linguistic, Biographical and Technical Dictionaries and general reference works have been placed, while, in a bookcase at one end of this reading-room, collections of an encyclopædic and bibliographical character and sets of important magazines will be found. In this way about 14,000 books are placed at the disposal of the readers.

A new system has been adopted for the card catalogue. Instead of the former double division of the catalogue into subjects and authors, all the catalogue cards have been placed together and now form a "dictionary catalogue," in which authors and subjects are arranged in alphabetical order. The thorough revision of the present catalogue was also commenced during the summer, but some time will elapse before the revision is completed. Meanwhile, the new arrangement, though to a large degree temporary, will, it is believed, be an improvement upon the former system.

A more thorough charging system has been introduced, and in future a special assistant will be found in constant attendance at the delivery desk, who will have sole charge of the issuing and return of books. Within a short time the rooms on the upper floors of the Library, now occupied by the University Museum, will be available for seminar purposes. The distribution of these rooms will be made in accordance with the needs of the various departments. The rooms will be suitably fitted up with desks and chairs, and shelving for departmental libraries.

The issue of the present number of the BULLETIN has been delayed by a combination of circumstances entirely beyond the control of the Editorial Committee. It is hoped hereafter that the BULLETIN may appear regularly not later than the 25th of each month.

Publications

OF THE

University of Pennsylvania

Group I.—Annual Publications.

University Catalogue (published in December).

Fasciculi of the Departments of Philosophy (Graduate School), Law, Medicine, Dentistry and Veterinary Medicine; also Circulars of Information concerning courses offered in the College: No. 1 (School of Arts); No. 2 (Towne Scientific School); No. 3 (Courses for Teachers).

Report of the Provost (published in January).

Group II.—Serial Publications.

Series in Philology, Literature and Archæology.

Series in Philosophy.

Series in Political Economy and Public Law.*

Series in Botany.

Series in Zoölogy.

Series in Mathematics.

Series in Hygiene.

University Bulletin (monthly).

Group III.—Occasional Publications.

Reports of the Museums of Archæology and Paleontology.

Theses presented for the Degree of Doctor of Philosophy.

†Group IV.—Affiliated Publications.

Annals of the American Academy of Political and Social Science.
Americana Germanica (quarterly).

Bulletin of the Free Museum of Science and Art.

Translations and Reprints from the Original Sources of European History.

American Law Register.

EXPLANATORY.

Group I consists of publications issued annually under the direct auspices of the Provost and Trustees.

The University Catalogue is a volume of about 500 pp. It contains detailed information concerning all departments, lists of officers and students, with addresses, etc. No charge is made for the Catalogue, but in all cases requests for a copy by mail must be accompanied by ten cents in stamps to cover postage.

The Fasciculus of each department contains information concerning that department *only*; while the three College Circulars of Information, covering respectively the School of Arts, the Towne Scientific School,

* Beginning with New Series, No. 1.

† For exchange purposes only.

and the Courses for Teachers, are in like manner restricted as to their contents. The Fasciculi and College Circulars are published separately after the University Catalogue, of which they are, to a large extent, reprints. Single copies are mailed free upon request.

The Report of the Provost, made by him annually to the Corporation, constitutes a general review of University activities during the year, and contains *inter alia* reports from the Treasurer and the several Deans. Single copies are mailed free upon request.

Group II consists of a number of serial publications in the several fields of literature, science and philology. They are issued in separate series at irregular intervals (for the most part), and represent the results of original research by, or under the direction of, members of the staff of instruction of the University. A complete list of these publications to date, *with prices attached*, is printed at length following. They are published under the editorial supervision of the University Publications Committee.

Group III consists of occasional publications, such as reports of the various University departments (where printed separately), and certain theses presented in partial fulfillment of the requirements for the degree Doctor of Philosophy.

Group IV consists of affiliated publications, issued as separate periodicals, not under the control of the University, but edited in part by officers of the University of Pennsylvania. Copies are obtainable from the University only through the medium of exchange (see Exchange Bureau, below).

EXCHANGE BUREAU.

The University of Pennsylvania desires to extend its system of exchanging publications with other similar institutions and learned societies, both at home and abroad.

For convenience in correspondence, the following statement is made:

To those educational institutions and learned societies which issue only annual catalogues, reports, or similar publications, the University of Pennsylvania offers in exchange all those of its own publications classed under **Group I** and **III**, or as many of them as may be specified.

To those educational institutions and learned societies publishing *also* results of original investigations, the University of Pennsylvania offers in exchange any one of its equivalent series in **Groups II** and **IV**, or as many of them as may be mutually agreed upon in order to maintain a proportionate ratio of exchange.

In establishing a system of exchanges with any other institution, the University of Pennsylvania binds itself to the following regulations:

All publications agreed upon to be forwarded from Philadelphia to address furnished, immediately upon issue, free of expense to our correspondent.

In return the University requests compliance with the following:

All publications to be forwarded to "Library of the University of Pennsylvania, Philadelphia, Pa.," marked "Exchange Bureau" in lower left-hand corner, immediately upon issue, free of expense to us.

Orders for single numbers, or sets of Serial Publications under **Group II**, and all correspondence relating to the publications of this University, should be addressed to

J. HARTLEY MERRICK, *Assistant Secretary*,
Station B, Philadelphia, Pa.

Philology, Literature, and Archæology

Volume I.

1. **Poetic and Verse Criticism of the Reign of Elizabeth.** By FELIX E. SCHELLING, Professor of English Literature. \$1.00.
2. **A Fragment of the Babylonian "Dibarra" Epic.** By MORRIS JASTROW, JR., Professor of Arabic. 60 cents.
3. *a. Πρὸς with the Accusative. b. Note on a Passage in the Antigone.* By WILLIAM A. LAMBERTON, Professor of the Greek Language and Literature. 50 cents.
4. **The Gambling Games of the Chinese in America: Fán t'án and Pák kóp piú.** By STEWART CULIN, Secretary of the Museum of Archæology and Paleontology. 40 cents.

Volume II.

1. **Recent Archæological Explorations in the Valley of the Delaware River.** By CHARLES C. AEBOTT, Sometime Curator of the Museum of American Archæology. 75 cents.
2. **The Terrace at Persepolis.** By MORTON W. EASTON, Professor of English and Comparative Philology. 25 cents.
3. **The Life and Writings of George Gascoigne.** By FELIX E. SCHELLING, Professor of English Literature. \$1.00.

Volume III.

1. **Assyriaca.** By HERMANN V. HILPRECHT, Professor of Assyrian and Comparative Semitic Philology and Curator of Babylonian Antiquities. \$1.50.
2. **A Primer of Mayan Hieroglyphics.** By DANIEL G. BRINTON, Professor of American Archæology and Linguistics. \$1.20.

Volume IV.

1. **The Rhymes of Gower's *Confessio Amanti*.** By MORTON W. EASTON, Professor of English and Comparative Philology. 60 cents.
2. **Social Changes in the Sixteenth Century as Reflected in Contemporary English Literature.** By EDWARD P. CHEYNEY, Assistant Professor of History. \$1.00.
3. **The War of the Theatres.** By JOSIAH H. PENNIMAN, Instructor in English. \$1.00.

Volume V. \$2.00.

Two Plays of Miguel Sanchez (surnamed "El Divino"). By
HUGO A. RENNERT, Professor of Romance Languages and Literatures.

Volume VI. \$2.00.

- a.* **The Antiquity of Man in the Delaware Valley.**
- b.* **Exploration of an Indian Ossuary on the Choptank River, Dorchester Co., Md.** With a description of the crania discovered by E. D. Cope; and an examination of traces of disease in the bones, by Dr. R. H. Harte.
- c.* **Exploration of Aboriginal Shell Heaps on York River, Maine.** By HENRY C. MERCER, Curator of the Museum of American Archaeology.

Philosophy

- 1. ***Sameness and Identity.** By GEORGE STUART FULLERTON.
- 2. ***On the Perception of Small Differences.** With special reference to the Extent, Force, and Time of Movement. By GEORGE STUART FULLERTON and JAMES MCKEEN CATTELL.

Political Economy and Public Law

†Volume I.

- 1. ***The Wharton School Annals of Political Science.** March, 1885.
- 2. **The Anti-Rent Agitation in the State of New York.** 1839-1846. By EDWARD P. CHEYNEY.
- 3. **Ground Rents in Philadelphia.** By EDWARD P. ALLINSON and B. PENROSE.
- 4. **The Consumption of Wealth.** By SIMON N. PATTEN.
- 5. **Prison Statistics of the United States for 1888.** By ROLAND P. FALKNER.
- 6. ***The Principles of Rational Taxation.** (Read at a meeting of the Association, November 21, 1889.) By SIMON N. PATTEN.
- 7. ***The Federal Constitution of Germany.** With an historical introduction, translated by EDMUND J. JAMES.
- 8. **The Federal Constitution of Switzerland.** Translated by EDMUND J. JAMES.

* Out of print.

† No copies available for exchange.

† **Volume II.**

9. **Our Sheep and the Tariff.** By WILLIAM DRAPER LEWIS.

† **Volume III.**

10. **The German Bundesrath.** A Study in Comparative Constitutional Law. By JAMES HARVEY ROBINSON.
11. **The Theory of Dynamic Economics.** By SIMON N. PATTEN.

† **Volume IV.**

12. **The Referendum in America.** A Discussion of Law-Making by Popular Vote. By ELLIS PAXSON OBERHOLTZER.

Volume V.

13. **Currency Reform.** By JOSEPH FRENCH JOHNSON. 25 cents.

CONTRIBUTIONS FROM
The Botanical Laboratory

Volume I—No. 1. \$2.00.

(Plates I-XIII.)

1. **A Monstrous Specimen of *Rudbeckia hirta*, L.** By J. T. ROTHROCK, B.S., M.D.
2. **Contributions to the History of *Dionæa muscipula*, Ellis.** By J. M. MACFARLANE, D.Sc.
3. **An Abnormal Development of the Inflorescence of *Dionæa*.** By JOHN W. HARSHBERGER, A.B., B.S.
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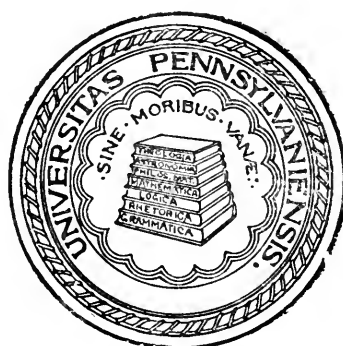
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2. **Properties of the Locus $r = \text{Constant}$, in space of n Dimensions.** By PAUL R. HEYL, B. S.

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PROCEEDINGS OF THE CORPORATION.

At the stated meeting held on Tuesday, November 1, the following business was transacted :

Announcement was made that another expedition had been sent to Babylonia under the auspices of the University, in charge of Dr. John H. Haynes, the necessary firman having been granted by the Turkish Government. The resignation of Dr. George C. Stout as Assistant Demonstrator of Histology was received and accepted. The following nominations were confirmed: Dr. Henry D. Martien, Assistant Demonstrator of Veterinary Anatomy; Dr. Mazyck P. Ravenel, Lecturer and Demonstrator in Veterinary Bacteriology; Mr. Abram H. Wintersteen, Lecturer on Business Law and Practice; Mr. J. A. Orr, University Scholar in American History; and Mr. H. M. Speaker, University Scholar in Semitics. The following address was received from the class of 1848, and ordered spread upon the minutes :

The Provost and Board of Trustees of the University of Pennsylvania.

Gentlemen:—The lapse of fifty years has not diminished our regard for the men who were our instructors under the appointment of your predecessors, and our admiration for them in our early manhood has deepened with the appreciative respect which has come with larger experience and observation.

We congratulate you, their successors, on the prosperity to which the University has attained. The growth, as we have watched it, has been most gratifying, and its roll of honored names marks it as one of the ablest and most successful educational institutions of our country. The time has come when no Pennsylvanian need go elsewhere for collegiate training, and when there are few places in our land from which it may not attract thoughtful minds.

Very respectfully,

S. EMLEN MEIGS, *Chairman,*

WM. L. BOSWELL, *Secretary.*

Philadelphia, October 21, 1898.

A proposal from the Class of 1872 to erect a memorial gateway upon the University campus was referred to the Provost, with power. A plan for a uniform system in the collection of tuition and other fees, as recommended by the Board of Deans, was approved. The privileges of the Library were voted to students of theological seminaries, and the students of Normal schools attending lectures at the University. Sanction was granted for the use of the College Chapel in connection with the William Pepper Memorial meeting.

BUSINESS EDUCATION IN THE HIGH SCHOOL.

[Address by Prof. E. R. Johnson, of the University of Pennsylvania, before the Business Education Section, National Education Association, Washington, July 8, 1898.]

A discussion of business education in the high school naturally involves the consideration of two questions. Ought there to be included in the American public high school system an educational course or curriculum constructed with especial reference to the vocational needs of the students who are looking forward to a business career? and second: if business education has a proper place in the public high school, what should be its nature and scope?

The general reasons why definite and adequate provision for business education should be made in the public high school have been so frequently and ably presented by educationists and business men that it would be supererogation for me to repeat them at length on this occasion. The argument for this education rests on a dual basis: the educational needs of the public demand it, and it is requisite to the best development of our high school system.

The high school is the institution of last resort for the great majority of boys and girls who carry their studies beyond the elementary grades. It is the institution in which are developed the ideals and powers which are to control the spirit and efficiency with which they perform the civic and economic duties that their subsequent lives will

exact of them. Life is complex and its duties are diversified, but the high school instruction as at present organized requires nearly the same work of all pupils. Although many schools have two courses, the classical and the scientific, the studies offered in each course are usually all required of every boy or girl pursuing the work of the course. Moreover, the contents of both courses are such as rather to prepare the pupil for the subsequent pursuit of those special studies which fit for entrance into some learned or technical profession, than to give the young person that education which will incline him to business pursuits, and give him the knowledge and mental habits that will help him to become an intelligent and successful business man.

The boys who expect to enter business when their school days are over—and they constitute the majority of the boys to whom the pursuit of a high school course is possible—find that no course of study has been provided in our public school system, by means of which that secondary education can be secured which is essential for him to possess who aspires to become an educated business man.

The result of this is that but few boys graduate from the high school before entering the business shops, stores and offices. Indeed, if there be deducted from the high school graduates those persons who have pursued secondary studies as a preparation for teaching, or for the higher studies that prepare for admission to the various professions, those remaining will constitute but a small percentage of even the relatively limited number of our youths who complete the work of the high school. The high school is at present not appealing to the boys with business ambitions as strongly as it ought.

This statement suggests the other basis upon which the argument for business education in the high school rests. In order for the high school to attain that measure of development which will enable it to fulfill the educational

functions which it ought to exercise, it must include within its work of instruction those studies which are needed by the boys and girls who are to enter the business callings. As Professor Edmund J. James has said in his well-known report on "The Education of Business Men in Europe," "We can conquer the uneducated and half educated people of this country for secondary and higher education only by offering them courses of study which, while they are of a strictly *educational* character in the best sense of the word, shall also have some bearing on their future every-day life,—shall have some direct relation to the work they are called upon to do in the world."

The practices and experiences of foreign countries confirm the soundness of these theoretical reasons for including business education in the American high schools. It is true that there are few if any foreign institutions which can be bodily and without change successfully transplanted to another country. Like most exotics they will not flourish in the unnatural environment, but in the case of educational institutions there is seldom any difficulty in one country adopting the spirit and ideals which the experience of other nations has shown to be of value.

In Austria, France, Germany, Belgium and Italy, and in Japan, business education has come to be recognized as an essential part of the educational system of each country. The degree of development varies in the different countries, Germany having the most fully organized plan of business education, industrial and commercial, of both higher and lower grades. Five years ago there were fifty-five schools in the German Empire of the rank of commercial high schools with an attendance of 5,681 pupils. Some of these institutions are supported by merchant guilds, some by cities, and others by the State. Beside these schools there are commercial classes and commercial courses connected with the *reals* schools (*Realschulen*) and supported by the state and the cities. The commercial high schools of

Germany are largely attended by foreigners as well as by Germans. The success of these institutions of elementary and secondary rank is evidenced by the fact that a state commercial school of an advanced grade corresponding to our colleges has just recently been opened in Leipzig. With the increase of these higher institutions for business education as the public demand shows the need for them, Germany will cover the entire field of business education in a systematic manner.

According to Prof. James's report, already referred to, there are in Austria thirteen commercial academies, or high schools, as we would call them, with an attendance, in 1893, of about 3,000 pupils. Besides these there were reported to be 104 institutions covering very much the same ground as is occupied by the commercial colleges in this country. In France there are two commercial high schools in Paris, and one in each of the five cities, Lyons, Marseilles, Rouen, Havre and Bordeaux. Besides these so-called Superior Schools of Commerce, there is at Paris a school of higher commercial studies, in which the more advanced grades of business education are covered. The school at Rheims is now a state institution; the Rouen school is controlled by another educational institution, the other six schools are controlled by commercial corporations; all are subsidized by the state. In Belgium there is the well-known Superior Institute of Commerce at Antwerp, supported three-fourths by Belgium and one-fourth by Antwerp. This institution has a course covering three years, the latter two of which are made up of studies more advanced than those of secondary education. In Italy, schools of commerce are to be found in Venice, Florence, Turin, Genoa, Naples, Rome, and in some other smaller cities.

The success of these schools abroad shows that there is a real demand for business education of a kind that is not now obtainable in this country. The prevalence of foreign students in these schools, two-fifths of the total enrollment

at the Antwerp school consisting of foreigners, shows that the value of their educational work is recognized by the people of other countries.

The advocates of the inclusion of business education in the public high school system are supported, not only by the theories of educationists and the educational practice and experience of foreign countries, but also by the active co-operation of many prominent men who are working to further business education in America. The views of men like the late William H. Rhawn, formerly president of the American Bankers' Association ; of Mr. Theodore C. Search, President of the National Association of Manufacturers of the United States, and Mr. John H. Converse of the Baldwin Locomotive Works, and of others who might be named, carry much weight. In a letter recently written, Mr. Converse says, "I consider it eminently desirable that there should be a Commercial High School, or a commercial course in the existing High School ; experience will show which is better. In any event there should be, I think, in connection with our secondary schools a commercial course which should be optional, but not obligatory. I would go even further than this, and say that there should be in our universities a commercial course as an elective or supplementary to the regular course." Though this last sentence is somewhat foreign to the subject under consideration in this paper, it deserves quotation because it illustrates the liberal views of education held by many successful and influential business men.

The other consideration involved in this discussion is the nature and scope which business education in the high school should have. What kind of education ought the high school system to develop, if it is to provide courses framed with reference to the vocational needs of boys who are to go into business ?

The first fact to be emphasized in considering this question is that business education in the high school should

be no less liberal, no less educational, than that received by the pupils who pursue the courses now offered in the existing high schools. Though intended to minister to the needs of prospective business men, business education in the high school should not be technical in the sense of teaching the technique of business. The ideal should not be to train pupils in the arts of business ; the aim should not be to turn out skilled clerks, but young men with an education that will enable them in due time to take their place in the ranks of educated business men. Before the would-be physician begins those studies which have to do with the art or practice side of his chosen profession, he takes a course of study whose core is made up of certain natural sciences. He studies the interaction of forces in that large world of life of which man is a part, that he may understand the relation of man to that larger world, and be able to know and deal intelligently with the forces which control man's physical well being. Similarly, the boy who expects to enter some particular field of business needs to study the laws and forces which obtain in the larger realm of business, and to analyze the political and social forces which dominate the social world in which he is to live and carry on the special business of his choice. The technology of business should be given only an incidental place in high school business education.

The core of the instruction given should consist of the social sciences. Economics, the science of business affairs, should rank first in importance, and the instruction given should cover the various branches of practical economics as well as the theory of the science. Industrial and commercial history should form an important part of the instruction in economics. Political science, or the study of civic society, should rank next to economics. The political organization of society should be studied in all its more important phases. These courses in the social sciences, constituting the core of the instruction given,

should most of them be required of all students. The work in English and in accounting should also be required of all, and should be comprehensive and practical. If feasible, most of the other courses offered should be made elective. The modern languages should be given a prominent place as electives; courses in general and applied mathematics should be available; and the natural sciences, especially physics and chemistry, should be open to election.

In introducing business education into our high school system, the principle of elective studies and selective courses should be accepted at the outset. The acceptance of this principle does not compel us to disregard the disciplinary value of high school studies. All high school education should be disciplinary, and by making the studies which constitute the core of instruction in each course required work for those pupils pursuing that particular course, the disciplinary character of the education will not be lost. We have long since abandoned the notion that there is only one combination of studies possessing disciplinary value. The required studies in the social sciences, as indicated above, would comprise from one-third to one-half of the pupil's work; the rest of his work should be selected by him, aided by the counsel of teachers and parents, with reference to the vocation which he intends to follow when his school-days are ended. The vocational needs of the pupils will be varied, and the range of selection should be made as large as the school can afford.

Business education in the high school should be both disciplinary and selective. There is no reason why it can not be both liberal and of vocational value. In a recent address on the "Scope and Function of Secondary Education," Professor Nicholas Murray Butler closed with the following paragraph:

"A secondary education that is both disciplinary and selective is of unusual importance in this country, on both

social and political grounds. Democracy needs intelligent and trained leadership—leadership in public policy, leadership in industry, in commerce, in finance, leadership in art and in letters. The basis of training for leadership is laid in the secondary schools, where the directive capacity of the nation is serving its apprenticeship. There the majority of men and women who are to guide the destinies of the next generation are putting forth their powers and testing their strength; out of a variety of intellectual interests, nature and environment lead them to make a selection. Training—persistent, thorough, broad—in the field chosen, is the surest guarantee, if one can be given, of future success and of future usefulness.”

Cf. “The Educational Review.” Vol. xvi, No. 1, pp. 26-27.

It will doubtless be argued that the scheme here outlined of business education in the high school, whatever may be its merits as an ideal, is impracticable, because of the difficulties in the way of securing its adoption and putting it into operation. The argument has force; it is usually much easier to secure half than the whole of a desired reform. It is nevertheless always of advantage to have a clear concept of the ideal to be ultimately attained; the half-way measures secured will be better if we clearly conceive what whole-way measures would be. The advocates of business education in the high school should strive for the proximately obtainable; but should not, while doing this, lose sight of the ideal, nor cease working for its ultimate attainment. As regards the relative merits of selective courses of study, as compared with the course of study in which the same work is required of all pupils, I am convinced that it will not be long before the superiority of selected work will have been generally acknowledged. The selective system has triumphed in higher education, and it will surely win in the field of secondary study.

A practical question of much importance, and one that ought to be given careful consideration by American cities,

is whether the business education of the secondary schools should be provided for in separate institutions by establishing business or commercial high schools, or should be inaugurated by adding a commercial or business course to the existing literary high schools. In New York the plan which has been adopted contemplates the establishment of a commercial high school as one of the four high schools with which the city is to be supplied. In Philadelphia the Board of Education has only recently adopted a course of study to be given in a Department of Commerce connected with the Boys' Central High School. The experience of foreign countries where business education has become a successful and permanent feature of secondary education is on the side of separate institutions devoted entirely to the work of business education. Prof. James says concerning the experience of Austria :

"The same experience has been met in Austria as in other countries; that the attempt to develop commercial courses side by side with other courses in the same institution has not been successful. Generally speaking, such courses have given satisfaction to no class of people; they interfere with the healthy development of other courses in the institution, and are uniformly neglected by the authorities of the institution with which they are connected."

Cf. "Education of Business Men in Europe." P. 52.

This discussion of business education in the high school can not properly be brought to a close without calling attention to the fact that business education should not be confined to secondary education. The high schools of this country should develop the best possible system of secondary business education. Like the work of all high schools the business or commercial high schools should be organized with reference to the needs of the community, and not with regard to the demands of the higher institutions of learning. Its courses should be outlined primarily with reference to the educational needs of those who are to

engage in active business pursuits upon the completion of their high school studies, for they will always constitute the majority of the pupils. But, however well the high schools may carry on the work of business education, they can no more give the future business man the education which he needs in order adequately to meet the requirements which his station in life will exact of him, than can the literary and scientific courses of the existing American high school furnish that liberal culture needed by those who are to enter upon studies that prepare for professional careers. Both the business man and the professional man need higher education. As the Director of the Leipzig Commercial Institute has well said: "The large dealer has no less important functions to perform than the educated individuals of other classes, and he can fulfill them satisfactorily only if he is willing to give as much time and care to his education as the members of other classes are willing to give to theirs."

Cf. "Education of Business Men in Europe." P. 162.

The higher education of business men has made more progress in this country than has secondary. The Wharton School of Finance and Economy of the University of Pennsylvania has been in successful operation for sixteen years, and three other universities have recently established schools similarly organized. The Chicago University and the State University of California will each inaugurate a "college of commerce," this autumn, and the authorities of the University of Missouri will open such a college as soon as the Legislature appropriates the requisite funds.

The necessity for providing, both in secondary and higher institutions of learning, educational courses adapted to the vocational needs of prospective business men is fast gaining public recognition. It is the special duty and privilege of educators to formulate clearly the ideals which should pervade this new field of education.

NOTES.**The Library.**

The University receives every year most of the dissertations published by students who have taken their degrees at German universities and technical schools. These dissertations, which are in many cases of great value for purposes of research, are received through the Exchange Bureau of the University. The average number received yearly is 1200. To make them accessible to students the following plan has been adopted. All the dissertations received from the universities and the technical schools of Germany have been divided: first, according to universities; and second, within each university according to the groups—Philosophy, Mathematics, Medicine, Law—represented in the collection. The philosophical group has been still further subdivided into Classical Philology, Germanics, Semitics, Modern Languages, History, Philosophy, etc. The dissertations falling within each subdivision are placed together in pamphlet boxes, the titles on the outside of the boxes indicating the contents. A space has been set aside for the collection in the second floor of the book-stack.

It is proposed in time to prepare a complete catalogue of these pamphlets, but meanwhile they are in convenient shape for consultation and use. The chemical dissertations are sent direct to the Chemical Laboratory, and those falling within the subdivision "Germanics" are deposited in the Germanic Seminary.

Chemistry.

Two translations of German works relating to chemistry have just been made by members of the chemical staff. The first bears the title "Chemical Technical Analysis," by Ulzer and Fraenkel. The translator is Dr. H. Fleck. In the compass of about 190 pages the authors have set forth, in examples, a number of the very best schemes for the solution of technical products. Drill in this line of work is becoming more and more necessary on the part of those who apply their chemical knowledge to the up-building of great industries.

The second translation is that of Traube's "Physico-chemical Methods," which is generally conceded to be about the

most satisfactory guide for chemical students who desire a practical knowledge of such physical methods as are helpful in solving various chemical problems. The character of the course given in this book appeals very largely to the graduate student. The translator is Dr. W. L. Hardin.

Various investigations are progressing at this time in the Chemical Laboratory. In addition to a mass of electrolytic results, already obtained, attention is being given to the re-determination of the atomic masses of the elements vanadium, palladium and cadmium by new methods. The present indications are that excellent results will follow, as the preliminary tests have proved very satisfactory. For some years the atomic mass of the metal tungsten has engaged the time and attention of a number of the more advanced students. The disagreement of the many experimenters who have wrestled with this problem has not yet been satisfactorily settled. New lines of research have opened up, however, and from these valuable data have been gathered, which will contribute very materially in solving the existing difficulty. Interesting work has also been done in connection with the ethers of tungstic acid, and certain derivatives of aconitic acid. The results are ready for publication.

Law.

The *American Law Register*, the official publication of the department, in its October number contains the following articles: "Conditional Subscriptions to the Capital Stock of Corporations," Part I, by Professor Brown, and "Statute of Wills: Its Real Significance and its Continued Perversion by Courts," by Dr. Harry E. Kohn, a graduate of the department. The October number contains the second part of Professor Brown's articles, as also an article by William M. Meredith, of the Philadelphia Bar, on "Is Secretarism a Bar to Exemption from Taxation as a 'Purely Public Charity;'" also, the first of a series of articles by Thomas Kilby Smith, a graduate of the department, entitled "The Rise of Federal Judicial Supremacy in the United States."

The first two volumes of Professors Pepper and Lewis' Digest of Pennsylvania Decisions have appeared. This digest

will consist of from eight to nine volumes when completed, and will contain the decisions of all courts of record in Pennsylvania, from 1754 to January 1, 1898. The facts of the cases are arranged under principles of law, the work being the result of nearly five years of labor on the part of the editors and their assistants.

Languages.

At a meeting of the Association of Teachers and Students of Languages in the Graduate School, held on Monday afternoon, November 7, two papers were presented, one by Professor William A. Lamberton, on "Some Peculiarities in the Use of the Trimeter in Greek Tragic Poetry," and a second by Professor Morris Jastrow, Jr., on "Earth, Dust and Ashes as Symbols of Mourning Among the Ancient Hebrews." It is hoped that these meetings, which are planned to take place monthly, may lead to closer contact in their work, and to greater cordiality amongst the students engaged in the study of languages at the University. At the next meeting, to be held the first week in December, a paper will be presented by Dr. Alfred Gudeman, on the "Sources of Plutarch's Life of Cicero," and another on the "Pedigree of the English Drama," by Professor F. E. Schelling.

For the coming meeting of the Modern Language Association of America, to be held during Christmas week at the University of Virginia, two papers have been offered by members of the English Department. Their titles are: "Some Tendencies in English Contemporary Poetry," by Cornelius Weygandt, Instructor in English; and "An Investigation into the Text, Date and Authorship of the Elizabethan Play, 'The Fair Maid of Bristow,'" by Arthur Hobson Quinn, Instructor in English.

Biology.

Two new greenhouses have recently been erected at the Botanic Garden, each 59 feet by 13 feet, and parallel to the recently equipped palm house. One is filled with cool orchids, begonias and foliage plants; the other contains half-hardy-plants and supplies of seedlings for garden and class use. The

suite of eight houses now contains a large variety of plants, and is proving of the utmost value alike for undergraduate, graduate and research study.

The Zoölogical Department has received two contributions of material for study, namely: histological preparations of *Peripatus*, from the Cape of Good Hope; and a series of shells of *Dreissensia* from Germany, which will be of value for the study of organic variation. It may also be noted that the pond in the Botanic Garden has developed a varied fauna, particularly of *Protozoa*, and thus presents a rich collecting ground for zoölogists.

A great transformation has lately been effected along the line of Pine street, from Thirty-sixth to near Thirty-ninth street, owing to the removal of this area from the city plans in March by action of Councils. What was formerly a rough cobble street has become a pleasant walk, bordered by grass and shrubberies. Through the interest of friends of the university a rich collection of mountain rhododendrons was secured, and these planted amongst other masses of vegetation will give to the walk a perennial beauty. The lighting of the walk by a row of powerful arc burners is almost completed. At the upper end will stand a memorial gateway, presented by the Class of 1873, and now in course of erection.

ABSTRACTS OF RECENT PAPERS.

Earth, Dust and Ashes as Symbols of Mourning Among the Ancient Hebrews.

MORRIS JASTROW, JR.

[Abstract of paper read before the University Language Union, November 7, 1898.]

The paper was devoted to an investigation of the custom of putting earth and dust on the head as symbols of mourning or grief, and various ways of using ashes as similar symbols. A distinction must be made between the use of earth and dust on the one hand and of ashes on the other. Earth and dust were commonly placed on the head, but instead of putting ashes on the head, the ordinary custom was to sit in ashes, or to roll oneself with ashes or to cover oneself with ashes. There are only two passages in Biblical literature in which the custom of putting ashes on the head is referred to—II Samuel xiii. 19, and Judith ix. 1. In both instances, however, it is impossible to suppose that ashes are really meant. The Hebrew word used in the passage in the book of Samuel

admits of the reading "apher" instead of "epher." The former word occurs in I Kings xx. 38 and 41, in the sense of some kind of a turban which can be drawn down over the eyes. Either this word was meant by the writer in Samuel instead of *epher*, or we must read *pe'êr*, which is the common word for the feminine head dress. This head dress was removed in days of mourning or grief. Tamar takes it off as a symbol of her distress after having been maltreated and dismissed by Amnon. Judith puts it on as a sign that her days of mourning for her husband are over.

Coming back now to the use of earth or dust, which is invariably placed on the head, attention was called to a remarkable monument of ancient Babylonia, the so-called Stele of Vultures, on a compartment of which there is represented a burial scene. The fallen soldiers are arranged in symmetrical rows, and attendants stripped to the waist and with baskets on their heads, are busy building a mound for the purpose of covering the dead. The baskets evidently contain the earth required for the burial; but the fact that the attendants are stripped to the waist is significant. Tearing of garments so frequently spoken of in the Old Testament in connection with the putting on of sack-cloth was in reality a tearing off of the upper garment, and the substituting for it a similar covering made of a coarse stuff, which hung down from the loins. Since this return to a simpler fashion as a sign of mourning is frequently found in juxtaposition with the putting of dust or earth on the head, the conjecture was offered that the scene on the Babylonian monument offered an explanation for the custom under consideration. The dust was originally placed in a basket on the head to be used in covering the dead body, and what afterward became the mourning garb, was the costume worn by the surviving relatives when engaged in burying their dead. The changes in the mode of disposing of the dead naturally brought about modifications of ancient customs. The basket was discarded, but the custom of putting dust or earth on the head remained. Similarly, the garb worn at the funeral, instead of constituting the sole article of apparel, was worn under the ordinary clothes, and instead of tearing off one's garments, one contented oneself with merely making a rent in one of the seams.

In conclusion, the significance of the use of ashes as symbols of mourning and grief, was discussed. The theory advanced by the late Robertson Smith, that the ashes were taken from sacrifices offered at the grave, was accepted as fulfilling the condition in a more satisfactory manner than other suppositions.

The paper will be published in full in the Journal of the American Oriental Society.

A Peculiarity in the Treatment of the Greek Tragic Trimeter.

WILLIAM A. LAMBERTON.

[Abstract of a paper read before the Language Union, November 7, 1898.]

Attention was called to the well known fact that the *cæsuræ* is not so much a break as a joint. It was shown that this fact has rhetorical as well as metrical significance.

Further, it was argued that the combination of subordinate pauses of various kinds with the regular cæsure has a tendency to set off the central dipody of the line, so as to make it a section around which the whole trimeter plays. This was also shown to be the case by the frequent appearance here of certain words of cardinal importance for the structure of the sentence and the expression of its meaning. In consequence of this character of the middle dipody, it may be used as a means of attaining rhetorical emphasis, and this in one of two ways: (1) Either the words in this dipody may be themselves emphatic or emphasizing words, the less prominent words being placed in the first and third dipodies; or (2) the words in the middle dipody may be unimportant from the point of view of emphasis, while those in each of the two others, or in one of them may be emphatic or emphasizing.

As confirmatory of this, some statistics were given to show a noticeable tendency of certain words (*ὅδε*, *οὗτος*, *πᾶς*, *οὐδέ*, etc.) to drift into the middle dipody.

Examples were cited from the *Prometheus*, the *Alcestis* and the *Antigone*, illustrative of each of these modes of treating the middle dipody, in order to give proper relief to the rhetorically important words and phrases.

Two further facts were noted: (1.) In lines which have no cæsure, or the so-called quasi cæsure, there results an annihilation of the middle dipody as such, and the effect produced is both metrically and rhetorically a shock, stronger or weaker as the case may be: on examining the instances that occur, it is found that this shock, due to the unusual and unsuspected form of the verse, is correspondent to the startled or startling nature of the sense to be expressed. (2.) There is a large (comparatively) number of lines in which the penthemimeral cæsure is followed by a monosyllable, and an about equally large number where it is followed by a disyllabic word reduced to a monosyllable by elision of a final vowel; appropriate cases of *ὅδε* are most frequently found in this place, of *οὗτος* not so often.

From the Biological Department.

At the recent meeting of the American Association for the Advancement of Science in Boston, Professor J. M. Macfarlane read a paper on "The Structure of Some Hybrids between *Drosera filiformis* and *D. intermedia*." The plants were collected at Atco, N. J., and in histological details showed a minute blending of features more or less common to both parents, as well as the inheritance of structural features peculiar to one or other parent, but reduced by about half in the hybrid offspring. Professor Macfarlane also presented a paper by Miss E. Simons on "The Circumnutation of Plants as Affected by Temperature." At the University Botanic Garden the writer studied certain species of twining plants previously used by Darwin, and she found that the revolving

movements were made on the average in about half the time he recorded. The marked increase in rapidity of movement was regarded as being largely due to exposure to higher temperatures.

The following is a brief synopsis of papers recently published:

In the Bulletin of the United States Fish Commission, Dr. J. P. Moore writes on "The Utility and Methods of Mackerel Propagation," in which he points out that attempts to propagate the mackerel artificially on a large scale will probably fail, and that there is no danger of its commercial extinction.

In the proceedings of the Academy of Natural Science, Dr. Moore describes a new genus and species of sponge which he names *Hyalodendron navalium*.

In the same periodical, Dr. J. W. Harshberger has a paper of forty-two pages, entitled "Observations on the Flora of Mexico, especially on the Flora of the Valley of Mexico." An enumeration is made of 245 species collected; references are added regarding their local Spanish and Indian names, medicinal and other uses. Botanical observations are recalled on the ecology, morphology and physiology of the plants. A brief sketch is given of the geography and topography of the places visited; and an itinerary.

Dr. Philip P. Calvert has published the following:

A Biographical Notice of George Henry Horn. (Transactions of the American Entomological Society, vol. xxv, pp. i-xxiv. With Portrait.) Philadelphia, July, 1898.

Dr. Horn was professor of Entomology in this University from December 3, 1889, until his death on November, 24, 1897. His eminence in his specialty is shown by his admission into the limited number of Honorary members of the entomological societies of Stettin, France, Belgium and Russia. This account of his life is followed by a bibliography of his entomological writings (265 titles), and an index to the genera and species of Coleoptera, which he described, prepared by Mr. Samuel Henshaw (Trans. l. c., pp. xxv-lxxii).

The Odonate genus *Macrothemis* and its Allies. (Proceedings of the Boston Society of Natural History, vol. 28, pp. 301-332. Two plates.) July, 1898.

In addition to stating the structural characteristics of this group of tropical American dragon flies, data of variations from generic characters are given as being opposed to the general view that the female sex is less variable than the male, and as furnishing clues to the genetic relationships of the insects in question.

Burmeister's Types of Odonata. (Transactions of the American Entomological Society, vol. xxv, pp. 27-104. One plate.) Philadelphia, October, 1898.

The German zoölogist, Karl Hermann Konrad Burmeister, once Professor in the University of Halle, later Director of the National Museum at Buenos Aires, published descriptions of numerous species of insects

in 1839. These are much too brief for modern needs, and the author, having visited the museums at Halle and at Cambridge, Mass., where most of Burmeister's original specimens ("types") of Odonata are now preserved, has here given detailed information concerning them.

Further Notes on the New Dragon Fly, *Ischnura kellicotti*. (*Entomological News*, vol. ix, pp. 211-213. One plate.) Philadelphia, November, 1898.

A summer excursion of the Naturalists' Field Club of this University having resulted in the discovery of a new species in New Jersey, it is here described in co-operation with Mr. E. B. Williamson, of the Carnegie Museum, Pittsburg, who independently discovered it in Indiana.

Dr. T. H. Montgomery, Jr., has recently contributed the following papers:

Descriptions of Two New Exotic Species of the Genus *Chordodes*.—(*Zoöl. Jahrb.*, XI, 1898.)

Description of the Female of *Chordodes albibarbatus* Montgomery.—*Ibid.*

The *Gordiacia* of Certain American Collections, with Particular Reference to the North American Fauna. Part 2. Proceedings California Academy of Science. Third series, I.

PROCEEDINGS OF THE GRADUATE BIOLOGICAL CLUB.

The first meeting for 1898-99 of the Graduate Biological Club was held on October 17, at 8 p. m. Dr. E. G. Conklin gave an account of the past season's work at Wood's Holl, and stated that 130 students and investigators were present. Dr. J. M. Macfarlane outlined the proposed studies in Botany to be carried on there next year. Dr. T. H. Montgomery, Jr., spoke on "The Correct Use of the Term 'Centrosome'." Dr. J. W. Harshberger described *Bacterium photometricum*, obtained by him while studying during the past summer at Berlin. Dr. Macfarlane exhibited and commented on a branched rhizome of the pink lotus, about thirty-five feet long, which had grown in the pond of the University Botanic Garden during the summer.

A meeting was held on November 7, when Dr. L. Witmer described "Cases of Constitutional or Habitual Bad Spelling," depending on defective development of the visual organs. Dr. P. P. Calvert spoke on "The Relative Variability of the Sexes in Dragon Flies," as determined by him in various collections. His conclusion was that variability was considerably greater in females than in males. Dr. J. P. Moore exhibited and described a few of the rarer fishes from the Hyrtl collection, bequeathed by the late Dr. Cope. Dr. Macfarlane reviewed the recent work on "Plant Grafting," by M. Daniel.

BISMARCK'S SERVICE TO GERMAN CULTURE.

[Address delivered by M. D. Learned at the Bismarck Memorial Celebration in the Metropolitan Opera House, New York, October 18, 1895.]

The nineteenth century has been an epoch of great ideals and at the same time of great realizations and realities, an age of matchless heroes and transcendent heroism, the barest mention of which must awe the epigon-monger into silence. The meteoric appearance of Napoleon on the horizon of Europe, the humiliation of Prussia, the dissolution of the Holy Roman Empire, the final grapple between the dread Corsican and the united Powers in the Wars of Liberation, and the consequent awakening of the national consciousness of the German people; the emancipation of four millions of American slaves in the war of secession; the struggle between Prussia and Austria for the sovereignty of the German States; the deadly conflict between France and Prussia for the border lands of the Rhine and the resuscitation of the German Empire; and, fresh in our own minds, the final dismantling of the once proud armadas of haughty Spain by that nation for whom Columbus discovered a new world—all bespeak the greatness of the epoch in which we live. Heroic figures tower from the midst of these events—Napoleon, Wellington, Blücher, Wilhelm I., Bismarck, Moltke, Lincoln, Grant, Dewey. But above all these *one* has eyes which flash fire—*Bismarck*, "*der Mann von Blut und Eisen*."

Bismarck's military and diplomatic achievements are known through all the world. He has been called "*der Begründer des deutschen Reichs*," "the author of German unity," "the maker and unmaker of kings," "the defender of monarchism," "the friend of absolutism," the Iron Chancellor, "*der grosse Junker*," the reincarnation of Odin, the typical "*Germane*." * He was in full measure all of these things, but he was more.

* This idea has just received fresh treatment at the hands of Kuno Francke in an essay entitled, "*Bismarck as a National Type*" (*Atlantic Monthly* for October, 1895).

There is a decided tendency, especially among the more republican classes, and certainly among English-speaking people on both sides of the Atlantic, to regard Bismarck as the apostle of monarchism by the grace of God, and of militarism as superior to humanitarianism in the growth of national power, and accordingly to represent his influence as a check to the highest cultural development.

But what of the facts? as Bismarck's policy out of harmony with the cultural impulses of the age and of the German race in particular? In a word, what was his service to German culture? Let us glance at the cultural traditions of Germany into which Bismarck was born. For a hundred years a new intellectual spirit had been growing among the German people. Since the early eighteenth century German genius had been asserting itself and the national consciousness had been finding expression in German literature. The new message received from England, that literature is life, had been heralded as a new evangel of letters. Bodmer and his Swiss coadjutors had re-echoed it from the Alps and it had been heard on the banks of the Pleisse. Klopstock, the apostle of German patriotism, had given to his country a great national epic, so bold in its flight, to be sure, as to be lost in the clouds, and had sung in classical measures his "*Vaterlandsliebe*." Lessing had enunciated the true secret of a national literature, had laid the foundations of a new criticism and boldly defended the spirit of toleration. Herder had caught the charm of Hamann, the "Magus of the North," and had preached in new form the nature-gospel of Rousseau. A new generation awoke and strode forth in the midst of "storm and stress" as new-born giants—Goethe emancipating the individual and Schiller heralding liberty for the people. The great Frederick had by his military successes raised Prussia to a proud position among the powers of Europe. Kant had promulgated a philosophy which was to burst the iron bars of Locke's theory of

the *Human Understanding* and to inaugurate the new era of *Vernunft*. The Romanticists had revolted anew against the monotonous reign of rationalism to unite the lost glory of Germany's earlier days, with the freer impulses of the "return to nature" thus continuing the impulse which had flamed up in the fiery spirits of "storm and stress." Then had come the dissolution of the German empire, the awakening of the German nation from its lethargy, the Wars of Liberation, the popular demand for constitutional liberty and the stifling reaction.

But out of it, or in the midst of it all, a new national ideal had been forming, or an old one had been revived and reinvigorated. The labors of the pedagogians had not been in vain. A spirit of the olden time had appeared on the Hasenheide, teaching the youth the long lost secret of their fathers that physical prowess is the foundation of true national growth. Again Romanticism and "Storm and Stress" were to join hands to rear a new race of German heroes, worthy successors of the ancient Germans who had swept down in irresistible hosts upon the legions of ancient Rome—men from the common walks of life, but bearing upon their front the mark of princes, chosen to restore the imperial glory of the Fatherland.

Bismarck is the logical issue of these cultural processes, the gigantic culmination of the national yearnings of a hundred years.

In origin he was a *Junker*, descended from a family whose annals go back 600 years to Heribort von Bismarck, the Master of the Merchant Guild at Stendal (1270), and reared in that bountiful plenty and freedom which belong to the class of the landed proprietors, but with that austerity of discipline which brings up staunch defenders of the established order and loyal servants of the king. In stature Bismarck was the physical ideal of an ancient German. Father Jahn must have seen in this young Parliamentarian the realization of his *Altgermane* revived in heroic propor-

tions. Then those eyes, with the irresistible penetration of a god! The cleverest inventions of the Wagnerian stage, with its Sigfried and Hagen, can not surpass this living survival of the age of Germanic giants. He towers with Sigfried, Hildebrand and Theodoric of Bern. As a soldier, too, he possessed that fearless confidence in manifest destiny which reflected the ancient German's belief in fate. He had a true German fondness for combat, and was by nature and choice rather soldier than diplomat and statesman. In intellect Bismarck was an original, worthy of the *Geniezeit*, ignoring the tedious processes of the schools, but at the same time absorbing with astounding rapidity the real essence of learning, intuitively discriminating between the useful and the useless, always preferring action to words, and hence giving his time rather to the *Mensur* than to the *Colleg*. But, be it observed that Bismarck passed his law examinations without the usual assistance of the professors and lectures; and his subsequent career shows no lack of grasp in matters of jurisprudence. It was the mind of the Titan, taking in at a glance what the average man sees in succession.

Bismarck appeared in public life at the most critical period of German history. For more than two-score years the absolutism of Metternich had repressed the constitutional aspirations of the people by persecuting even the suspects of revolutionary designs. But at last the people could bear no more. The revolution again burst forth with volcanic vehemence, Metternich himself fled to England and the Republic was declared. Confusion reigned among the German States, but there was one man in Germany who could see order in the chaos, and that man was Bismarck.

The guiding principle of Bismarck's policy was very simple and soon apparent, it was *conservative evolution*, not *revolution*. Material foundation, cultural superstructure, defence first, development afterwards; the final appeal, *Blut und Eisen*, "Fear God and keep your powder dry."

Bismarck's policy was based upon the theory of historical continuity in national growth. Hence we find him accepting the political and social conditions as they had come down to him in the history of the German nation. The essential features of the German State as he saw them in the light of history were *the sovereignty of the Christian State, the divine right of kings, the inalienable rights of the classes and the control of the masses*. Bismarck's theory of the Christian State finds expression in his speech on the emancipation of the Jews, delivered June 15, 1847 :*

“ Ueber den Begriff eines christlichen Staates haben wir von dem Herrn Minister des Schatzes und von einem anderen Herren auf der Ministerbank Worte gehört, die ich fast ganz unterschreibe ; dagegen haben wir auch gestern gehört, dass der christliche Staat eine müssige Fiktion, eine Erfindung neuerer Staatsphilosophen sei. Ich bin der Meinung, dass der Begriff des christlichen Staates so alt sei, wie das *ci-devant* heilige Römische Reich, so alt, wie sämtliche europäische Staaten, dass er gerade der Boden sei, in welchem diese Staaten Wurzel geschlagen haben, und dass jeder Staat, wenn er seine Dauer gesichert sehen, wenn er die Berechtigung zur Existenz nur nachweisen will, sobald sie bestritten wird, auf religiöser Grundlage sich befinden muss. Für mich sind die Worte ‘ Von Gottes Gnaden,’ welche christliche Herrscher ihrem Namen beifügen, kein leerer Schall, sondern ich sehe darin das Bekenutniss, dass die Fürsten das Scepter, was ihnen Gott verliehen hat, nach Gottes Willen auf Erden führen wollen.”

In his speech before the United Diet at Berlin, June 1, 1847, he made public his view of the sovereignty of the king : “ Es fragt sich nur, wer das Recht hat eine authentische rechtsverbindliche Deklaration zu geben. Meines Erachtens nur der König, und diese Überzeugung liegt

* Ludwig Hahn, *Fürst Bismarck. Sein politisches Leben und Wirken*, etc. I. 9.

auch, wie ich glaube, im Rechtsbewusstsein unseres Volkes." While Bismarck here is speaking of the Prussian *Volk* in particular, he evidently means it to apply to the German people in general. Thus he is operating, as he thinks, with the monarchic principle which is instinctive in the nation. He was indeed "plus royaliste que le roi."*

In like manner Bismarck as representative of the conservative proprietary class was following a deep-set instinct of the nation and hence when he voted in the interests of his class in the Diet, he was only defending the rights of the classes, which he considered the stable element among the people. Indeed he was not far astray in thus expressing the guiding principle in all civil legislation—the principle of individual interest, which after all is but the general interest in miniature. To him the masses had as yet no clearly defined rights except those which had been granted them and were not yet in a position to formulate their demands into a stable form of legislation.

With this platform Bismarck continued his work of reorganizing and restoring the German Empire, in a succession of brilliant achievements, each making an advance in the direction of imperial unity. These achievements were the averting of a general revolution, the establishment of Prussian supremacy in the war with Austria, the final establishment of German independence in the Franco-Prussian war, the unification of the German States, the restoration of the empire, the reconstruction of the federal constitutions, the reorganization of the army, the revision of the civil code, the establishment of a foreign policy, the cultural reform through the "Kulturkampf," the adjustment of conflicting party issues, the introduction of economic reforms, the establishment of a system of finance, the encouragement of industry and the final completion of the system of national instruction.

* Cf. Wilhelm Böhm, *Fürst Bismarck als Redner*, etc. Collection Spemann. I. 14.

Bismarck had in his earliest parliamentary period the idea of a united Germany clearly in mind, as is evident in his speech before the United Diet, April 8, 1848. "Wenn es wirklich gelingt, auf dem neuen Wege, der jetzt eingeschlagen ist, ein einiges deutsches Vaterland, einen glücklichen oder auch nur gesetzmässig geordneten Zustand zu erlangen, dann wird der Augenblick gekommen sein, wo ich dem Urheber der neuen Ordnung meinen Dank aussprechen kann, jetzt aber ist es mir nicht möglich." He was then as this passage shows "auf dem alten Wege," a conservative way toward a united fatherland. His first step was to avert the threatening general revolution. Here his policy of conservative evolution came boldly to the front. The revolution was to him a foreign element, un-German, and hence unwise for the German people.* He says: "I do not think that these evils can be remedied by democratic concessions or by projects for a united Germany. The disease lies deeper and I dispute that there has ever existed in the Prussian people any need for a national regeneration on the pattern of the Frankfurt theories."† He later found, however, that there was need of reform if not revolution, and so the infuriated *Stadtvertilger* later achieved a revolution in the guise of reconstructive reform.

What the outcome of a general revolution in Germany would have been we may not say, but one thing is certain, that the geographical position of Germany was such as to tempt the ambitious designs of more than one envious neighbor, particularly of France and Russia. The history of the 'Thirty Years' War was a sufficient warning of the

* In speaking of the popular uprising in 1813, he says: "Ich habe immer geglaubt, dass die Knechtschaft, gegen die damals gekämpft wurde, im Auslande gelegen habe; soeben bin ich aber belehrt worden, dass sie im Inlande gelegen hat und ich bin nicht sehr dankbar für diese Aufklärung." The true motive power in the history of these days was a mere lust of theft to be swept from the earth, a poisonous miasma that was brewing in the cities.

† Charles Lowe. *Prince Bismarck. An Historical Biography.* I. 65.

dangers of dissension among the German states, though it had required the defeat at Jena to teach the necessity of German unity. Bismarck's penetrating eye could see that of all the German states Prussia alone was the hope of the German nation and that union of the German states under the hegemony of Prussia was the only political salvation for the German people. In the face of the revolutionary outbreaks in Berlin and the liberal constitution issued by the king, Bismarck was forming conservative reactionary sentiment by his contributions to the newly founded *Kreuzzeitung* and preparing "to oppose with force and emphasis the unchained demons of revolt and to devote especial attention to the internal development of Prussia and Germany."* He could even promise to support the king in his liberal policy, and continue in his own way the effort to "reknit the loosened bonds of trust between crown and people," not terrorized by the ominous German Marsellaise :

" Wir färben echt,
Wir färben gut,
Wir färben mit
Tyrannenblut."

Accordingly he guarded with an eagle eye the diplomatic alliances of Prussia, beginning thus early the development of his foreign policy. He insisted at every step upon the sovereignty of the Prussian crown and constitution and spurned the ideas of the Frankfurt constitution and the compromising proffer of the imperial crown to the king of Prussia.

Consistent with his policy of non-interference, Bismarck opposed Prussian participation in the Crimean war against Russia and in the Italian war against Napoleon. It was in October, 1862, that he made the famous declaration that the great questions which were then confronting Europe, and Germany in particular, "would not be settled by dis-

*Charles Lowe. *Prince Bismarck*. I, 71.

cussion and decisions of the majority, but by *blood and iron*.”* And it was not long till this declaration began to be fulfilled in the Schleswig-Holstein struggle and found its consummation in the battle of Sedan.

The Schleswig-Holstein conflict was soon followed by the decisive victory of Prussia over Austria at Königgrätz, thus demolishing the last hopes of the Austrian line to the crown of the new German empire. Thus the absolutism of Metternich had for the time been swept away by the more liberal national monarchism of the Prussian *Staatsminister*, and the beginnings of the *Kulturkampf* were already visible.

In 1864 Pope Pius IX. had issued his famous “ Syllabus of Errors ” (eighty-four in number), thus inaugurating a counter reformation, which should offset the ninety-five theses of Luther and annul the 350 years of Protestant reform ; in a word, turn back the dial of progress to where Luther found it, with the further purpose of establishing papal infallibility and political supremacy. In short, the Pope had now taken up the mantle of political absolutism which Metternich had dropped in his precipitous flight from power. Bismarck fully comprehended the cultural significance of these events and stoutly resisted any action on the part of the German States which might have the semblance of submission to the papal authority. In 1869 came the beginning of the end, the Ecumenical Council passed the papal proposal. The proclamation of the dogma of infallibility was made July 18, 1870, and the next day France declared war against Germany. The final struggle which had dragged its weary length along in various guises from the time of the Romans—the struggle between Roman and Teutonic culture—was now on. The issue all the world knows. It was the emancipation of Germany from the Roman yoke. The further details of the struggle, which bear the specific designation of the *Kulturkampf*,

* Cf. Charles Lowe. *Bismarck's Table-Talk*. P. 60 ff.

were the natural cultural sequence of the victory of German arms.

That was the proudest day in German history when the successors of Hermann placed the imperial German crown upon the head of a German king amid the dazzling splendors of Versailles.

But it was for the German people a not less significant victory which Bismarck achieved by his matchless statecraft in the *Kulturkampf*, when he emancipated the coming generations of German youth from mediaevalism through the enactment of the *Schulaufsichtsgesetz* and its logical successors, the famous *May laws*. It is in his interpretation of the *Schulaufsichtsgesetz* that Bismarck's cultural importance assumes heroic proportions. He says: "Wir halten es für ein Bedürfniss dass jeder Staatsbürger in die Lage versetzt werde, sich das Urtheil über die Regierung, die über ihm steht, selbst zu bilden, und dazu ist erforderlich, dass die deutsche Sprache mehr wie bisher gefördert und das Verständniss dafür gefördert werde, und das Unterrichtsgesetz und alle Vorlagen, die wir Ihnen machen werden, müssen von dieser Tendenz beseelt sein."* Again he says: "Our motto must be '*principiis obsta.*' We do not wish, as advised by some, to cut down people, but rather to educate them in such a way as not to make it necessary for us to cut them down."

Amidst the storm of opposition which followed, the Chancellor maintained his equilibrium, even making an effort to reconcile the Vatican to the new legislation, and when his friends feared the consequences of his pacific attitude, he was obliged to remind them that he had not changed base: "Seien Sie ausser Sorge, nach Canossa gehen wir nicht, weder körperlich noch geistig."

As no compromise was possible, his new cultural reform took shape in the "May laws" of 1873. These laws provided among other things, first, for the sharp separation of

* Hans Blum. *Das deutsche Reich zur Zeit Bismarck's*, S. 68.

ecclesiastical from civil affairs; secondly, that all candidates for the service of the Church should pass the required final public school examinations, and that they further should have the prescribed three years' theological course at a German university and should have the State certificate of liberal education, and that Church schools then existing should come under the supervision of the State, and that no new schools of this class should be established; and further, that ecclesiastical superiors should notify the State of intended appointments and transferences of clergymen, thus securing a uniform State supervision of all educational matters under the auspices of the Church.

The highest hopes of the revolutionists could hardly have entertained a more far-reaching reform in matters of popular education than that achieved by Bismarck, without violence, in the *Kulturkampf*. Indeed here the Iron Chancellor appears to have realized one of the most important ideals of the Revolutionists, thus demonstrating the truth of one of his early declarations, that he, too, was a republican in spirit.

The various supplementary enactments to the "May laws" were in the main measures for adjusting the application of these main principles. The Roman Church was little inclined to friendship for the Chancellor, but he could afford to wait a change of sentiment in the Holy See, nor was it long before diplomatic relations were resumed and the German Crown Prince was visiting the Vatican (an event which the Liberal press contemptuously called "der Gang nach Canossa") and the Pope was finally asking for Bismarck's portrait.

Thus the cultural revolution had come to be to the Catholics a Shakesperian "all is well that ends well." It was indeed for the Catholic Church in Europe the beginning of a new epoch, checking as it did a most disastrous enterprise, which might finally have wrought the destruction of the Church. Here, too, Bismarck, perhaps uncon-

sciously, was carrying out in his policy of religious toleration and separation of Church and State, the only logical means of preserving the integrity of Catholicism and of defending the faith of one-third of the German people. This part of Bismarck in the *Kulturkampf* is perhaps his greatest achievement. In it he completed the work of cultural emancipation which Luther had begun. With the legislation of the "May laws" a new epoch begins in German education. The institutional machinery of instruction was already in operation; the pedagogical system already in force; the scientific spirit already alive; but the policy of Bismarck and Falck, his *Cultusminister*, not only secured the privilege but even enforced the right of general systematic education in the German Empire, thus establishing a system of national instruction which has no parallel in the history of the race, and whose superiority is recognized throughout the world.

The crowning act in Bismarck's cultural reforms in cementing the German States into a united empire was his part in the re-organization of the University of Strassburg. The *allgemeine Schulpflicht* was introduced in April, 1871. Bismarck's efforts to Germanize the new territory, Alsace-Lorraine, were untiring and irresistible. In reply to a request of the *Gemeinderath* of Strassburg to allow French by the side of German in the elementary schools, Bismarck replied: "dass die gleichzeitige Erlernung mehrerer Sprachen nicht Aufgabe der Volksschule, und dass es vom erziehlischen Standpunkt richtiger sei, die in der Volksschule zu unterrichtenden Kinder mit dem sicheren Gebrauch einer Sprache in Rede und Schrift auszurüsten, als sie in die Lage zu bringen, dass sie von zwei Sprachen keine sich vollkommen zu eigen machen. Für diejenige Klasse der Bevölkerung, welche einen lebhaften Verkehr mit Frankreich unterhalte, böten ja die höheren Unterrichtsanstalten Gelegenheit genug zur Erlernung der französischen Sprache."

May 1, 1872, the new University of Strassburg was formally reinaugurated with imposing ceremonies by the imperial decree. Thus was given to the newly annexed people the full cultural rights of other citizens of the Empire. The enactment for reorganizing the university specified that the institution should be under the special supervision of the Imperial Chancellor. Thus the man who had dueled away his early student years at Göttingen and who had recommended the study of Russian as being more useful in modern life than ancient Greek, now places at the apex of his cultural efforts the newly founded university as the force which is to Germanize and nationalize the long lost peoples of Alsace-Lorraine.

"Wisdom is justified of her children." The policy of "blood and iron" has triumphed, it rescued the Germans from their hereditary oppressors. It brought to full fruition the imperial germ planted by Charles the Great and made possible the union of institutions under a monarchical form of government. It has solved, in a word, the essential problem of the Revolutionists of '48, without involving the German people in internecine wars. It has restored steady political equilibrium to Europe and made possible a form of culture which the proudest republics of the world may not surpass.

To the Germans in America Bismarck has become more and more the representative of that German unity for which thousands of Revolutionists fled the fatherland, and the survivors among these exiles who have made themselves glorious defenders of the new republic, their adopted fatherland, are now proud to do honor to the Iron Chancellor.*

As Americans who have just issued from a fierce conflict with one of the oldest powers of Europe, we may do well to heed the warning spoken by Bismarck in reference to the policy adopted by the Germans toward the French in 1814-1815: "Whoever wishes to see the diminution of military burdens in Europe or desires such a peace as

* Cf. note next page.

would permit thereof must look not to moral but to material guarantees as a solid and permanent barrier." The message then of "the man of blood and iron" to the American Republic, if heeded, will secure us against the humiliation of being summoned to combat with rusty armor.

Peace is a good thing, culture is a good thing, but the thing that all the world respects is force; let no sickly theorists persuade the American Republic that this nation is beyond the need of material defence to enforce its demands, even though the nation be at peace with all the world!

Behold, then, the work and the man. The *work* as he took it up was Germany, a dismembered empire, a confused aggregation of warring States, a people rife with revolution; Germany as he left it, a revived, consolidated Empire, consisting of these same States interlocked and intergrown with common interests and sympathies, pushing German industry and trade into the remotest corners of the world, a nation of scholars, statesmen and of citizen-warriors, each man an intelligent bulwark of national defence!

Behold the *man*! With an unflinching faith in God* and in the foundations of human society, and with a soldier instinct that must have been more than a match for the Great Napoleon, scorning the encomiums of his fellowmen, heeding only the voice of duty, submitting to his own iron principle of subordination in the service of the king and the people, he bequeathed to the German nation, and to the house of Hohenzollern in particular, the modest words as his epitaph—"Bismarck, the faithful servant of Wilhelm the First."

*Cf. Moritz Busch, *Bismarck: Some Secret Pages of his History*, I, 163.

NOTE.—Two German-Americans, Professor Julius Goebel and Hon. Carl Schurz, have recently testified to the high estimate which Germans in America place upon Bismarck's services to the German Fatherland.

Publications

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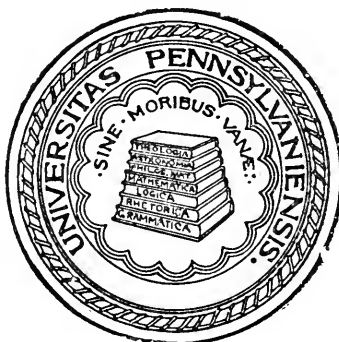
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THE INFLUENCE OF THE POET'S TIME ON THE POET.

A Lecture delivered before the Graduate Club of the University of
Pennsylvania, December 3, 1898.

By S. Weir Mitchell, M. D., LL. D.

Apart from its mere professorial aspects, the lecture should, I think, be looked upon as a distinct method of conveying information, and as capable of variations; a genus with several species. It ought not to submit to the formal restraints of the essay. It should have at times the wandering ease of chat. At best it should be such as to bring the lecturer into a certain pleasant personal relation with the audience. It can rarely cover all of a subject. The best lecturing does not so much think for you as invite you to think along suggested lines of inquiry. It should open by-ways, give glimpses of pleasant lanes, where in your serious leisure you may delight to wander. This, at least, is my conception of one of the forms of the literary lecture. Accept for to-day my view of this matter, for what I intend is to deal swiftly with a large subject—a too large subject—and to do this with the consciousness that I have here an audience of people who need but an allusive text to make for themselves a sermon. This view of my hearers has the charm of appreciativeness, and also the value of dividing the responsibility of failure, if fail I must.

All the greater poets and dramatists have made use of historical characters. Have you ever thought of the mechanism of these products? How are they evolved? How much is fact? How much is fiction—which is or may be but another name for larger truth? If the time of the dramatic action lie in or near that of the dramatist, he may have no need to prepare himself. If it be in another era, he must become so familiar with it as to be of it and to live in it while conceiving his characters. This involves

pre-assimilation of vast knowledge, and the subsequent construction of a complex character out of the little which history tells us in the way of barren fact. Once living on his pages, these children of genius assume, as he writes, an independence of act and speech which is always amazing to the parent brain. "When," said Thackeray, "my characters cease to talk for themselves, I lay down my pen."

The intense reality with which created characters live for the parent brain none know who have not been in this parental relation. This same Thackeray told me that at times he could not get out of the company of the characters he was creating. I once dined with Lowell and Browning and William Story. Of all these men said I remember only one thing—a complaint of Browning's that sometimes, in writing, the children of the brain would not say or do the thing they should. This gave me then a strange sense of the quasi-independence of the faculties which evolve for us the larger characterizations of the drama and fiction.

I shall not strain illustration too much if I say, as concerns the historic beings who are thus created, that, while fact is the father, the poet's imagination is the mother. If you are to have intellectually undisturbed enjoyment of these creations—of soldier, statesman, serf or noble—they must move and act amidst surroundings which shall add to their naturalness. And if the forms and ways of another time be so distinctly present as to make these children of the mind seem to you, the citizen of another era, foreign and unnatural, have a care, for the failure in appreciation may be your fault, and only yours. And it is true, I think, that the too great modern effort to place around these recreated beings the exact scenery, furniture, habits and dress of their time, the straining after realistic precision, sometimes injures for the reader the larger purpose of fiction or the drama. He has too much to digest that is foreign to the mental meal—too much to criticise that need not be

there. The spirit of the time is what the poet should desire. When, therefore, these creations seem to you untrue, it may be that you have taken no steps to put yourself into relation with the mood of the time, its dominant motives, its social, political and religious aspects. But if you have thus prepared yourself, you become free of this lofty society of men and women. Thus introduced, you associate with the poet's offspring on terms of vital equality. They live and breathe—are real in the better sense. For you cannot trust all to the poet. I am fond of saying that a book is the author, the book, and the reader. A few grown people I know, and many children, have the happy capacity to drift on and with the current of a story, a fairy-tale, a drama, asking no questions, wanting no guide-books. By such guests the gentle hospitality of the best books is used with gracious ease.

But there are those, as I have said, who have less power of acceptance, and must by some form of mental preparation earn what comes to others by nature's gift. These vast galleries of historic and other portraits present the utmost variety of style and technique—from Calderon to Shakespeare, from Molière and Cervantes to Schiller, from Scott to Thackeray. Now it is a mere sketch, now a full-length. Too often it is a one-sided presentation; the heroic or other dominant quality is presented in its fulness, but only a part of the man is shown us—a side-face, so to speak.

Not so with the greater masters. I have counted the named characters in Shakespeare. There are about seven hundred, and a host of minor accessory folk. When we turn to this world of the men and women life's greatest painter drew, however heroic they be, a certain naturalness in his methods is seen. His great people move at ease. On the verge of vast events, between the storms of action, they talk of the weather, of skies and flowers, of their diet and their clothes, of every-day

household matters. They pun, -jest, gossip. And all of this flows naturally out of the poet's mind with the other and larger traits, passion, humor, the most tragic violence, until the whole conception leaves with you a sense of living truth, or, as in life itself, you remain at the last puzzled forever as to what you shall conclude. What, think you, would be to-day a jury's verdict on Hamlet? Was Falstaff a coward or not? There is a fine reality about these enigmas. And of the historic creations, how much is fact, how much fancy?

That admirable teacher and gentleman, Professor Henry Reed, was fond of asking his pupils to write for him their conclusions as to the amount of fact and the extent to which constructive imagination was used in some work of genius. It is a good study for the children of a larger growth. Take a novel like "*Quentin Durward*," a play like "*Henry the Eighth*." How far correct is the portraiture of Katherine, how far true to history is the large figure of Wolsey? You are shocked as you read at the disregard of known facts. You delight to observe how the developmental art of the poet, transcending the little we know, achieves at last a vitalized result, so that the man, the time, and the heroic action become instructive far beyond the arid statements of facts and the deductions from these which alone the historian permits himself to make. Moreover, it is safer not to doubt Shakespeare too much. He lived close to the history he relates in drama. What he tells us of Henry the Eighth and others was the popular view of his day; and as the sources of history are laid bare, his characterization of Bluff Hal seems more and more reasonable, his panegyrics on Elizabeth deserved.

Nearly all the great events and great men of the past have been the subjects of dual descriptions: the historic and poetic. They have been variously dealt with. It is profoundly true of all art that a little disregard of the apparent truth is needed in order to tell the more spiritual truth which lies

behind exterior facts. An artist abandons the literalness of absolute verity as to form and color in order to get into your minds the sentiment of a landscape as he feels it. He omits this, he emphasizes or exaggerates that. It is not a photograph—there is no worse liar than the camera—it is something better. And just what the artist does is what the writer of any form of historic drama is led to do. But to ascertain what he has taken and what he neglects is, it seems to me, an interesting study of one of the highest functions of the human mind. Nor, as I have urged, is this mental function of genius any more comprehensible to the poet than to the reader, who but sees results. For here you reach the limit of available inquiry. The quality of mind through which a congruous character is thus born out of the use constructive imagination makes of scant material is beyond our ken, like all creative functions. Says Tasso, "There are but two creators, God and the poet."

I shall now ask you briefly to consider two examples of the use of real characters in poetry, and then leave you to think over the value of this form of study. I say study, for it is not easy work. Paracelsus was a charlatan of whom not a great deal is known. He was also a mystic and a philosophic thinker. A great poet takes this character, studiously learns all that is known of him, and electing to disregard the minor qualities and the worse ones, elaborates a strong portrait of the mystic and philosopher. It is episodal, limited, imperfect, but splendid. Shakespeare would have given you a larger picture of the entire man, with vast perspective of all his qualities, the good and the bad, like the massive portraiture of the old Bible. The one is intellectual shadow, the other would have had color and substance.

Mention of the Bible brings to my memory that the earliest illustrations of the contrasted pictures of historian and poet are to be found in its pages. Let us consider one

of them. In the book of Judges, chapter fourth, is a crude statement of the defeat of Sisera by Barak, the flight of Sisera, and his death at the hand of Jael. In the next chapter the poet Deborah tells the same story in one of the finest of historical poems. For some reason much that the historian omits is in her stormy ballad. The reproach of the lingering coward is here, the fury of battle, the rush of the whelming river, the tragedy of the tent. In the historian's statement Jael drives the tent-nail through the head of Sisera asleep and weary, and fastens it in the ground; that is all: but the poetess evidently sees the strong man with the nail in his forehead stagger to his feet, sway and fall, not at, but between the feet of the dusky murderess. What a picture! And then comes Deborah's realization for her enemy of vain hopes and of the bitterness of defeat.

And thus having left with you these seeds of thought, I turn to the larger and more difficult purpose of my lecture. I have just now hinted to you that the proper preparation for the study of the literature of an era, or of even one of its greater voices, would be some such brief exposition of its manners, actions, beliefs, and habits as should enable the serious-minded to enter into the spirit of the time, and thus fitly to apprehend the meanings of the poet. A nobly frank young woman once said to me that the women in Shakespeare seemed to her to talk as women might, but that the men appeared to her stilted, affected and often unnatural. The thought, however crude, has its interest. It is a fit text to evoke discussion, for at first view there is in it a certain amount of surface-truth or appearance of truth. It at least illustrates the difficulty of reading a poet without a large knowledge not merely of the facts but of the spirit of his time: the latter as, I think, a far more important matter. With a certain humility I venture to tell an audience as cultivated as this that what I want to do is to put before you certain thoughts as to the era of Shakespeare, and so—

I hardly dare say it—to help some of you to see that Shakespeare's people were to him the *very* people of his day, and that in their ways, beliefs, and talks they resembled the men and women whose historic features are in a hundred books of biography or national story. If I succeed at all, I shall measurably have put you into nearer relation with Shakespeare by making you more fully apprehend the spirit of his mighty hour.

Everything, one would think, must have been said of Shakespeare that can be said. My sole excuse is that Shakespeare is like nature, exhaustless. There is always a margin left for the thought of the years as they come and go. Some of us at least must acknowledge in this day of guarded speech and self-repression that what my young friend said is what at times we must have felt in reading the wild cries of Hamlet at Ophelia's grave, the riotous fun of certain of the comedies, the audacious gayety of Mercutio, the love-talk of Romeo, or the speeches of King Henry to his troops. Does it seem to you always natural? Can you believe that men ever did talk so near to such talk as to justify their poet? Nevertheless it is my own belief that what the various people in his dramas say to and of one another is in reality far more like what the men of his time did ordinarily say in their social intercourse or under spur of excitement than would at first sight seem probable.

If there is one literary label I hate more than another, it is the word Realist. Shakespeare was not this in any modern sense, nor careful as to what to-day disturbs the literary conscience of a school. He drew men and women, careless if Hamlet and Horatio were like Danes or Mercutio like an Italian. The place and scenery—the setting—may give you a foreign effect, but for the most part there is little effort to get this kind of result. Some of the plays are mere dramatic fantasies, some fairy-stories. In these his characters move with the gay freedom of romance. But of the seven hundred people who tread his stage a large number

are historical, and of these and of many others it is true I think, that they were in ways and thought simply of his own time and land.

An interesting defence of the lofty talk of the Shakespearian drama awaits us as we study the lyric and other poetry and the prose of his day. There is, in this connection, much evidence to prove that the manner in which the poets of that reign wrote was, on the whole, nearer to their ordinary talk than is the case nowadays. Naturally, the language of prose and that of verse differ in many ways, but vary with the country, the tongue and the era. So far as English is concerned, the quality of the language of verse and the language of letters and that of familiar speech have gone on diverging in form century after century.

The thought is curious. Let us see how far it is correct. The friendships of men in that time were like love-affairs. They spoke in their letters and their verse to and of one another as men in love may write. Think of the reticent gravity of "In Memoriam"—the noblest wreath which poetry has left upon a friendly grave—consider any of the many verses in which modern poets have praised their friends, and then turn to the sonnets of Shakespeare. When first as a lad I wandered amidst the maze of these poems, I thought it was of a woman he was writing. I learned soon with a sense of shock and dismay, even with a little disgust (for a boy recoils from sentiment) that it was a man of whom he wrote. It is all familiar to you :

"A woman's face, with nature's own hand painted,
"Hast thou, the master-mistress of my passion."

"Shall I compare thee to a summer day ?
Thou art more lovely and more temperate."

I take phrases at random. He is even jealous of a woman's love of his friend. Epithets of affection are lavishly used. He is his "sweet love," "lord of my love." So talked Fulke Greville of Sidney. It is as well here to

remember that, like much of the poetry of the day, these expressions of fervent friendship were not meant for the public, and that they were not in print until 1609, although there is reason to suppose that they were written long before, and at varying intervals.

And if such were the intimate language of friendship among men, can we wonder that in their love-affairs with women they should have attained a still more excessive use of language; such, indeed, as characterizes that singular and often most beautiful *In Memoriam* of a lost love, the "Astrophel and Stella" of Sidney, which is the more remarkable because its author was a man of much gravity, and whose inclinations lay rather toward a life of statesmanship than toward one of literary effort? If, as I have said, excess in language can be charged on the verse of that day, it was not because of its being meant to engage public attention. Much as Sidney wrote, he printed nothing. "His end," says Fulke Greville, "was not writing, even while he wrote." Men set in verse their innermost feelings because these were in those days intense, and because to some natures verse is nature's language. What Greville says of Sidney is true of Shakespeare: "He purposed no monuments of books to the world." And long before this, I may add, the first three books of "The Faërie Queene" lay nine years unpublished. All of this pleads for the naturalness of the forms of phrase these men used. They were eager for no immediate public hearing.

We willingly grant to the Elizabethan stage the privilege of elevated language, of soliloquy:—nowadays a rare thing, I fancy. We admit its right to be metaphorical, poetical; we give ourselves up to the excitement and fervor of its speech. The idle hour, the actor's art, assist our yielding fancy. But here in verses meant only for friends or for mere personal record, desirous of no ampler audience, are the same hyperbole and much of that constancy of metaphor and comparison which has passed out of our more

restrained and sober poetic diction. The whole social, dramatic and lyric literature of that day abounds in affluence of phrase, figures of speech, a certain excitement—what a boy would call tall talk.

It is also worthy of note that this excess is far less notable in our greatest dramatist than in Marlowe or his nearer contemporaries. Moreover, among them all, he is the least difficult to understand, the most cleanly, and the least given to that constant use of the slang of his time which makes a page of Ben Jonson's "Alchemist" so exasperatingly hard to read.

Recall too that it was an age of affectation among gentlemen and scholars. This began early in the long reign of Elizabeth and continued later. Sidney's "Defence of Poesy" was written probably about 1581, before Marlowe created the "drama of romance," and before Shakespeare, a very young man, came to London. Sidney even at that time writes of "the courtesan-like painted affectations of the English." He calls such talk "a sin against our mother speech, aptest of modern tongues to be the vehicle of simple and of beautiful utterance."

It was not Lyly and the pedants alone who wrote thus. The fine gentle who had traveled was not less guilty. And the fashion lasted. Nor is it probable that Osric, whom Hamlet and Horatio find so absurd, was in any sense overdrawn. "Love's Labor's Lost" is largely satiric of the high-flown talk of the Enphuists, and Shakespeare was then young. I think it quite sure that he himself did not wholly escape the influence of the very fashions he so amusingly satirized. But it is with the more serious of his plays and the talk of their characters that we have to deal.

Before we do this let us further justify my conclusions by a glance at the letters of that day. Here, if anywhere, in the discussion of business, people are apt to represent for us their common mode of talk. Is it unlike—too unlike—their drama? Let us see. We will take certain letters on

state affairs and try the pretty trick of putting a few of their more interesting passages into blank verse without notable change. Thought in the stately gait and clothing of great verse is full of charming deceptions. Put back your blank verse into prose, and see where you come out. The reverse of that is what I ask you to hear. And this is what Elizabeth writes to the pedantic, timorous James of Scotland. No book I know so brings you into close touch of the hour as this most piquant correspondence :

Listen to some lines of her lectures to her neighbor on kingcraft ("Letters of Elizabeth and James VI," Camden Society, 1849) :

"I praise God that you uphold ever a regal rule.
Since God then hath made kings,
Let them not unmake their authority.
Let little rivers and small brooks acknowledge
Their spring, and flow no further than their banks."
(*Letter XVII.*)

And again :

"Else laws resemble cobwebs, whence great bees
Get out by breaking, and small flies stick fast
For weakness."
"God forbid you lose the reputation of a king-like rule,
Since that unlike a king would work your own reproach."
(*Letter XXIV.*)
"For they be actions rather, and not words,
Which paint out kings and truly in their colors.
There be so many viewers of their facts
That their disorders [do] permit no shade,
Nor will abide excuses."
(*Letter LXXXVIII.*)

This is the fierce light which beats on a throne.

And this as to a legal instrument, a treaty which, as she says, she mislikes (*Letter XIX*, 1585-6) :

"Touching an instrument you'd have me sign,
I do assure you, though I *play* on some,
And have been brought up to know musick *well*,
Yet this discord would be of gross account,
Such as for well-tuned music were not fit.
Go teach your new raw counsellors better manners
Than to advise you such a paring off
Of ample meanings."

How pleasantly this recalls Hamlet and the pipe !

Many letters of Bacon to Essex occur in the "Lives of the Essex Earls," by Walter Devereux. It is curious to note that nowhere do they lend themselves to easy setting in blank verse. They are worldly and shrewd, but lack the crisp vigor of Elizabeth's letters to James. Did Elizabeth write Shakespeare? I would as easily think it as that Bacon did. If you feel any doubt as to this matter, read Bacon, not Shakespeare, and especially his letters, and you will see as I do that the play and excess of humor which are in all Shakespeare are nowhere in the able and crafty letters of Bacon. But humor can no man hide or put away. Like murder, it will out.

To return to our text. How far do the history and spirit of his time explain the lofty talk of the Shakesperian drama? Every era has its ruling qualities, to be seen only from the remote view of centuries later, just as the large geologic structural features of a mountain are to be seen only at a distance. A great sense of relief, of gladdened security, was felt by Protestant England when Elizabeth came to the throne. There can, I think, be no doubt that when young this woman was singularly attractive both in face and in figure. She rode, danced and shot admirably, was a fair Greek and Latin scholar, spoke French and Italian fluently, knew the poetry of Italy, read Tasso and Ariosto, and, like all the educated English of her day, delighted in Spenser's verse. Frank of speech, popular in address, she had the will, the pride, the courage and confidence of her race: a masterful lady. Says the historian Green: "She had the sensuous self-indulgence of her mother, Anne Boleyn. Unrestrained, vain, frivolous, utterly untruthful, the finest liar of her day, a coquette to the last, her recklessness gave occasion for many scandalous tales." Her follies served her well. They deceived the gravity of Philip, and at times drove her advisers to despair. Diplomats thought her deceitful when she was truthful, and honest when she was lying.

The Elizabeth of the council-chamber was another Elizabeth. Simple in life, frugal, cautious, careful—over-careful—as to money, even miserly, she was the type of a hard, cold, intellectual machine. Tenacious of purpose, moderate in her views, disaster left her undisturbed and victory did not flatter her into folly. “To keep order, to avoid war, to preserve religion, were her aims;” and as to the last she cared for the thing itself but little. She had not a large intellectual outlook. She groped her way to conclusions, but got at last the right one. She knew the English people. She was capable of firmness, but understood when to yield. She had the tact of politics. The lies, trickery, mystification, with which she outwitted every statesman in Europe were unknown to the mass of the English people. They saw the results—that was all. She knew men, and, as a rule, chose her agents with amazing skill. Her sympathy with poet, rover, traveler, soldier was instinctive. She had, too, the art of capture. She pensioned Spenser. Drake, that bad boy of the seas who enjoyed the mischief he did, was “my little sailor.” “What!” she said, “a peerage for Robert Vere, her gallant captain? Nonsense! He is Robert Vere.” Her character was complex. There is no doubt that, by nature cautious, her position made her more so—that limited means and her own temperament often made her hesitate when action, heroic action, was urged upon her by the call of religion and the courageous counsels of the soldier. Above all a Tudor, with the blood and habits of a masterful race in her veins, she was held back by traditional dislike to aid revolt in other lands, and it took a long time and the stern insults of events to bring her to the point of action in the Low Countries.

That the tremendous flattery which reached her was liked is probable enough. That in its excess was hidden some honest tribute to the strong admiration this woman won, to the great influence she exerted, cannot be denied. Nor

was it mere courtiers who so addressed her. If Sidney lied in what he said of her and to her in his frank and manly letters on the Anjou marriage, it was the one lie of a life of truth; and, believe me, there never was man who lied but once. See what Roydon said of Sidney, just then dead. He wrote no other verse like this. The subject inspired him.

"A sweet attractive kind of grace,
A full assurance given by lookes,
Continuall comfort in a face,
The lineaments of gospel bookes;
I trowe that countenance cannot lie
Whose thoughts are legible in the eie."

Elegie, Matthew Roydon.

Time goes on. 'This lion-hearted queen tames the great nobles, holds the heart of a people who know that Rome is plotting and that this woman is the heart and brain of the reformed faith. She is asked—urged—to marry. She coquets with this prince and that, but at the last will have none. In her lonely isolation, she turns for love to her people. "She is married," she says, "to the people of England, and will no other husband."

Discuss it as you may, explain it as you please, this strange man-woman won and held the heart of the peasantry, the willing homage of the great, the learned, the chivalrous and brave. And these she kept through many a day of peril and of gloom. For what a time was that! Here was Ireland, then, as now, a thorn in the side of England. Scarce a year was without its plots. She was excommunicate, in constant danger of the dagger of the assassin. The sometime friendliness with Spain passed away, for all the manhood and common sense of men were in revolt against the papal bull which gave one-half a world to the faithful sons of Rome.

And year by year, fed with that fatal gold of Mexico and Peru—gold which represented only unpaid toil of slaves—the vast, spectral form of Spanish power rose over Europe,

obliterated the ruling races of Mexico and Peru, and fell in gloom and bloodshed with axe and rack on the Low Countries. The trade of all the Indies was hers alone. In South America she ruled supreme: attempts at trade met with massacre. The rack and the Inquisition awaited such as fell into her hands. And at last, out of these exasperations was born a singular national struggle, chiefly within the seas Spain claimed as her own.

English enterprise broke out in numberless explorations and rash ventures. Willoughby, Grenville, Raleigh, Frobisher, Hawkins, Drake, and the Gilberts go and come back with store of Spanish gold and marvelous tales. It is a time of excitement. Men believe in the El Dorado, in the fountain of youth. The wars in the Low Countries at last win help from England, and here is another school of courage, where other heroes win renown, and the Norrises, Sidney, Raleigh, and the Veres are heard of. I pause to say that in the lately published lives of the Veres is to be found much evidence to make clear a good deal as to which Elizabeth has long borne reproach. At sea, on land, everywhere, as time runs on, there is a crop of heroic deeds. Then comes at last the funereal doom of Spain's last, great adventure, and in ruin and dismay her huge galleons drift away into the north seas, and so the cruel, splendid pageant of Spanish history begins at last to crumble and decay. Near this time Shakespeare came to London, and all through this long struggle of arms and deceit, not the Elizabeth of revealing history, but a popular, gallant, learned, witty, immovable queen, stood to the English of that day as their safeguard, their ideal of what a queen should be. It is difficult to overrate her personal influence. Can you wonder that amid such history and such romance these Englishmen found some strong need to represent its spirit in the lyric or the drama, and after a like heroic kind, or that amidst these fairy dreams of untold gold, of new lands, of brilliant ventures, even the common

talk of men, and of course their verse, took on some of the excitement which was in the very air of the busy, valiant, high-toned England of Elizabeth? Do not some of us remember the effect on men's ways and speech of the exciting hours of our own great war, or how it showed itself after Gettysburg or Lee's surrender? With all the accomplishments of those days of Elizabeth, all the fine manners and courtly ways, there was something child-like and simple about these fine gentles, and often enough they said what came into their heads, whether it was in the matter of love or of hate. They were quite sufficiently dramatic. Molineux, Sir Henry Sidney's secretary, opens a letter of Philip's addressed to Sir Henry; upon which writes Philip to him: "Few words are best. I assure you before God that if ever you do this again I will thrust my dagger into you. In the mean time, farewell. From court, this last of May, 1578." And England was gay in those days of risk and ventures. Song was an every-day matter. All classes had their songs. From the plough to the sword, every occupation found a voice in this expressive form. To sing, to play on some instrument, was a part of men's education. Most fine gentlemen then wrote songs, just as, at a later date, in Charles the Second's time, every gentleman of any pretensions must write a play. This Sidney who gave us much noble verse was soldier, statesman, and diplomatist. Spenser, the poet of poets, has left us one of the most remarkable state papers on the condition of Ireland to be found in all its stormy annals. These sea-rovers, like Raleigh, wrote verse and history. It was the fashion. Poets were soldiers, soldiers poets. Ben Jonson served in the Low Countries.

Says Philip Sidney, writing to his brother Robert, "Sweet Robin,"—what a pretty nickname!—"take a delight to keep and increase your music. You will not believe what a want I find it in my melancholy times." Singing was the common amusement. Mr. Stoddard men-

tions ninety-two separate collections of madrigals, ayres, roundelays, catches, glees, etc., between 1588 and 1638,—in all some two thousand songs,—many by unknown men or anonymous. Nor was the time less rich in music to match.

This glad rush of song had a meaning. Like the heroic drama arising out of the triumphant life of the nation, it faded and at last died out in Puritan days. In Germany it was otherwise ; for, as I have elsewhere remarked, Germany, Protestant Germany, has kept her song to this day because Luther loved music for its own glad and innocent sake.

And all this in a measure accounts for that gayety which is in Shakespeare and runs like a golden thread of cheerful joyousness through so much of his work. It was partly temperament, and partly the influence of the hour. The quality was in the air, and he but more delightfully than others represented a national peculiarity which found its most easy, frequent, and natural expression in song.

The England of to-day is sombre, and her literature is sad. The strength is still there, but there is no one great national motive, obeyed with obedience that asks no questions. The ruling idea among all classes in Elizabeth's day was the defence of the new religion. How seriously it affected the best is to be seen in "*The Faërie Queene*," where, with leaning to Puritanism, it continually shows itself. With Spenser, as with others, it included loyalty to a trusted queen. And, too, religious ardor was intensified by the political aspects it assumed. If the Roman Church made sharp the assassin's dagger and was the nurse and mother of wars, these threatened the lives and liberties as well as the religion of Englishmen. The feeling was so strong that while all young English who went abroad resorted to Venice—the Paris of that day—and to Pisa and Padua, Sir Richard Sackville tells Roger Ascham that Italy is a bad place for the young. They are apt, he urges, to return Papists or Atheists. There is a phrase of the

day,—“*Inglese italianato è un diavolo incarnato.*” Just as the English used to say later that a man was Frenchified, it was said in Queen Bess's time that he was Italianized. Hubert Languet, Sidney's French friend, above all urges on him to keep away from Rome; and so in fact did generally the young English who traveled. Sackville fears Romanism or Atheism, but he puts Rome first. Doubt has existed in all centuries, but there was little of it, I fancy, among the Protestant English gentry of that era. They held to their religion simply, with noble sincerity, and prayed, fought, or died like Christian gentlemen. And loyalty, politics, national pride, intensified their beliefs. Their wars were all wars of religion. Strangely enough, commercial interests contributed to bind the merchant and sailor class to the new religion; for it was Rome which forbade to them and their ships the rich trade of both Indies. When Drake or Grenville, Frobisher or the Gilberts, struck at Spain upon the seas, it was partly to revenge Spanish cruelties, partly for plunder where trade was forbidden, and with it all these men believed they were serving God in serving their country.

The heroics, the high-strung talk of love and friendship, the gayety, of Shakespeare, find also their partial explanations in the home peace, the growing wealth, and the national exaltation which came out of success on land and sea.

And as to religion, how was it with Shakespeare? Putting aside all former studies and preconceptions, I have re-read these dramas with this in view. I confess to being puzzled like the rest, but something in the way of conclusions has come to me. No man knows if Shakespeare was Protestant or Roman Catholic. Neither is the strife of beliefs largely represented here. Puritan is used once as a term of contempt, but of the great religious struggles of his century we get but faint gleams in his pages. Worldly reasons may have kept them out. He may have

cared nothing for them. At all events, undisturbed faith is the religion of Shakespeare's people. Very common nowadays is our literary use of men's doubts and difficulties as to religion. It has made a whole shelf-load of the fiction of to-day. It is nowhere in Shakespeare. One and all of his gentlemen are, as to this, simple, unquestioning souls. Only in "Hamlet," and in a phrase or two of Claudio's is there an approach to a doubt as to what was to come when the bare bodkin let out life and let in the vast reply of death. But Hamlet, despite the surroundings, is to me the most modern character in Shakespeare. I have no leisure to add proofs of my thesis. And just here, as I speak of Hamlet and of Sidney, let me ask you to compare Polonius's advice to Laertes with certain letters of these Sidneys. They touch alike on points I have already discussed. The old courtier's counsel is of this world. Sir Henry Sidney, also a great gentleman and viceroy of Ireland, writes to Philip about to leave school for Oxford. But this is a nobler Polonius. He tells his son to pray daily, and to digest feelingly the words used in prayer. He is to obey because to learn obedience is to learn command. What pleasant worldliness is in the advice to be courteous to all men, because there is nothing that winneth so much at so light a cost! It is a fine lesson in the conduct of life, beautiful to-day and forever. Read it when time serves, and with it the letter already alluded to of this Philip to his brother, that sweet Robin. Thinking of it lately, and of his praise of musical education, I was pleasantly surprised to find that old Polonius in his talk with Reynaldo, says of Laertes, "And let him ply his music," as if that were a bit of advice he had forgotten to give. Philip's letter goes on to advise Robin. "Look to your diet," he says, "and hold up your heart in courage and virtue. Also have a care of your complexion; for *gratior est veniens in pulchro corpore virtus*,"—a charming defence, that, of the desire for beauty of person. He must ride well, and fence

daily, because—and Sir Henry says it too—violent exercise improves the breath and giveth good wind; and so we come to Hamlet's "breathing time of day." Also as to Latin, he must read and speak it easily: that will be enough.

Very pompous are these letters in places, but, on the whole, pleasantly complete in advice as to this world and the next: as to religion, manners, study, exercise, diet, etc. They cover nearly all the ground of Polonius's more cynical creed, and are full, too, of a higher life and more heroic purpose. Sidney, that "heir of unfulfilled renown," was himself—like many men in those days—simply and devoutly religious; and as he was, says his father, the very formular of all well-disposed young gentlemen of the court, it is likely that to be a Christian gentleman was that which men took to be a reasonable and ordinary thing; and so it is that in Shakespeare's men religion is an accepted part of their character. Men did not then reason about God. Says Sidney of his friend and Mentor, the scholar Languet:—

"Languet, renowned
For faithful heart, clean hands, and mouth as true;
With his sweet skill, my skill-less heart he drew
To have a feeling taste of Him that sits
Beyond the heaven, far more beyond our wits."

Before we leave this much-loved gentleman, so often my text, share with me, as I read him and of him, the feeling that, despite great differences of character—for Sidney was a man of decision—there is about him some slight flavor which faintly reminds one of Hamlet, the scholar and the soldier, the disappointed lover, the warm friend; contemplative, philosophic, wanting humor, or too serious in its manifestations, melancholy, lacking preferment, an unused or half-used activity, excitable, at times unreasonable. It were absurd to insist on a vague resemblance; yet here, as elsewhere in the biography of that day, the imaginative critic is helped to comprehend Shakespeare, to learn to

breathe without effort the natural air of his drama. But to go back a little to the religion of his plays. Was it this assured faith, or the constant perils of those dangerous days, which made men take death as so natural a part of life? See how Isabel talks of death in "Measure for Measure," of her brother's death, you remember (Act ii., Sc. i.). Claudio's fear of it must have seemed strange to the men of Elizabeth's day. The duke's words better reflect the temper of the hour :

" Reason thus with life:
If I do lose thee, I do lose a thing
That none but fools would keep."

Very interesting are the deaths in these plays. They are singularly rare, compared to the wholesale exits from life in the dramas of his contemporaries. It is curious that, as a rule, Shakespeare's dying men ask for no priest, and say little except of earthly matters. Only the old reprobate Falstaff exclaims, "God—God—God!" in his delirium, and is told by Dame Quickly he should not think of God: "I hoped there was no need to trouble himself with such thoughts yet." Mortimer dies quietly discussing worldly affairs. There is no appeal to heaven, no word anywhere of priest or the last offices, although the poet is speaking of days when Catholicism reigned unquestioned. Hotspur complains, in death, only of his young life cut short, of loss of honor. And so of the fine heroics of the dying Talbot. Hamlet dies amidst such fierce sway of passions that we may not wonder that he says no word of prayer or supplication. Nor is there in the quieter manner of Mercutio's death a serious word: he dies a-jesting. We are reminded of Romeo's words,—

"How oft when men are at the point of death
Have they been merry!"

In the long apostrophe which follows, it is Juliet only, and love, that are in his mind.

Now, this strikes me as somewhat remarkable. Here

are various people dying variously, and only Desdemona asks time to pray, and little Arthur, when leaping in doubt if to death or to life, says, "Heaven take my soul." Nor was this the manner of Shakespeare's day, or quite natural. Men did go jesting to death—have done so now and then in all ages—and of this I shall speak presently. Sir Thomas More's humorous remark as to his beard when about to lose his head is, of course, familiar; but in this day men were simply and quietly religious, and their last thoughts were apt to be, like Sidney's, of the other world. When Sidney is dying he is asked, when speech has failed, to raise his hand, if he has hope of heaven. Pray recall that this is what the king asks of the dying Cardinal Beaufort.* It may have been common in those days.

You may explain as you please the small use of religion in Shakespeare, but as a hitherto not fully noticed generalization I think it worth putting before you: at least it may serve to show you that there is always margin for remarks about his work.

I have tried with the brief time allowed by custom to fill you with my own keen sense of the spirit of honor, valor, poetry, and venturous excitements which colored the characters of this marvelous time, of this heroic age. Whatever the faults of the Virgin Queen, she possessed that which in some fashion got out of men their noblest service. She both said and did heroic things; and, believe me, the women who influence men for good and towards honorable lives must of themselves possess in some measure the qualities they evolve and foster. Contrast her with that weaker soul, her cousin Mary, that "daughter of debate," for whom many died, and through whom none grew better or more noble.

I have tried to show you how in this fruitful time the excitement of battle, discovery, mad ventures, affected the lives, the speech, the letters of men, and also the drama. As I have insisted that this pedantic, high-talking,

* And see death of the first Essex, in "Lives of the Essexes."

valiant queen was both a natural product of her time and vastly influenced its men, I like to quote what Shakespeare says of her :

“ In her days every man shall eat in safety
Under his own vine what he plants, and sing
The merry songs of peace to all his neighbors.
God shall be truly known; and those about her
From her shall read the perfect ways of honor,
And yet no day without a deed to crown it.”

I am glad Shakespeare wrote that, because it seems to me a stately and truthful verdict. With all her frivolity, men did read from her the ways of honor. What finer thing can be said of man or woman ?

And here, as we near the close of this loose talk, I take my leave of Shakespeare with a strong feeling that even yet the element of dramatic construction, the art of his plays, needs to be competently studied. It is a quality which some have had who were not men of genius. But this is not in my programme ; yet one lingers. Each serious study of this great and varied mind adds to our astonished joy at its never-ending revelations.

I have told you what, as I think, is the best way to get into intimate relation with a poet,—by sympathetic study of his era. Fully, entirely to understand another epoch than our own is not possible. With all we know, guess, or imagine, we fail at last,—and never more than as to the golden time of great Elizabeth. You cannot always anticipate what events will do with the best or the worst of these heroic lords of sea and land. They do things we cannot explain. They rise to levels which nothing nowadays enables us to predict as with reason probable. It is not merely that they do heroic things : it is rather that their whole lives are so strange and wonderful, their general values so high. Heroism is of all ages ; never more of it than to-day, when peace and law have made the custom of courage or endurance more difficult by making it unhabitual. I could match Sidney's gift of the water to a dying soldier a hundred times in our daily

papers: I cannot match Sidney. I was told last week of a Confederate colonel who had to lose his leg by the knife. They said to him, "We have only chloroform enough for you." He said, "Give me a grip of your hand, and go on without it. One of these wounded boys will need it more than I." That seems to me a finer thing than Sidney's self-denial; but his was the sweet final natural flower of a beautiful life, not merely for his time a good life, but beautiful with act and word and deed and high-minded verse.

GRANT'S "DIFFERENCE" ENGINE.*

PARIS, November 16, 1898.

The box referred to in Dr. Morris Jastrow's letter of October 29, 1898, contains "Grant's Difference Engine."

About 1871 or 1872, George B. Grant was a student of chemistry at Harvard, and Professor Wolcott Gibbs noticed that he seemed more interested in mathematics than in chemistry, and found that he was devoting much of his time to the study of a "Difference Engine."

Professor Gibbs, knowing that this had been a favorite subject with me, interested me in Grant's work, with the result that I agreed to furnish money for the prosecution of Grant's experiments.

In 1876 Grant exhibited his first "Difference Engine" at the Centennial Exhibition, where it attracted some attention from the small number of persons competent to judge of it.

This first engine had numerous defects of construction, and was large and heavy. Grant, therefore, commenced a second engine, the first one finally being destroyed. At this time he had established himself in Boston as a manufacturer of engine-cut gears, that is, of toothed wheels cut from blank castings. He also made a simple adding machine, which was a success.

*[A large box, containing the assembled parts of an engine of peculiar construction, was recently discovered in one of the storerooms of the University Library. An investigation was at once undertaken to discover the uses of the machine and its inventor: the result of the search is herewith presented in the form of a signed statement from Mr. Fairman Rogers, a former trustee of this University.—ED.]

The demand for cut gears is not small, and as Grant depended on his business for his living, he had little time to devote to the engine; he did, however, work on it at intervals, the actual cost of such work being paid by me. Grant's overtime and labor were not charged for by him. Since I spent a portion of the year in Newport, I had frequent opportunities of conferring with him in his shop in Boston.

The engine in its present condition is completed in so far that it is capable of making the computations, but the printing apparatus, which Grant justly considers an essential feature, does not exist. The first engine had a printing apparatus with which I was satisfied, but Grant was never pleased with it, thinking, what is no doubt true, that it could be so improved as to give better results as to accuracy in the alignment of the figures.

Some years ago, Grant's health became seriously impaired, and he was forced to give up all work except a general supervision of his shop. The work on the engine was necessarily suspended and finally, on his removal to California, a few years later, the work was definitively abandoned; and the engine, having been sent to me, was deposited in the library of the University.

Computing machines have been made in a number of forms: the simpler kind are usually called "adding machines." They are all based on the same principle; the ordinary engine counter and the gas meter counter are simple types. After nine successive movements have been communicated to a wheel, its tenth movement changes the position of a second wheel, marking the first ten of a new series of figures; the connection of this second wheel with one marking hundreds, is similar to that of the first and second, and so a series of wheels may be connected which will register the successive addition of units up to any number. This is a counter.

A modification of this may be made by which *two*, *three* or any chosen number will be added at each movement, for example, $2 + 2 = 4$, $4 + 2 = 6$, etc.

The machine is then called an adding machine; and it is really a multiplying machine, since multiplication is only a

series of additions: thus $2 + 2$, or twice 2, = 4; $2 + 2 + 2$, or three times 2, = 6, etc. With the aid of an adding machine, therefore, multiplications are performed mechanically, the machine being so arranged that the fundamental number can be changed at will. If 3 is set up as this number, and 28 successive motions are given to the wheel, or the handle, the number 84 will appear as the result of 28 additions of 3 to itself, or as the result of the multiplication of 28 by 3.

The machine may be so modified that this fundamental number, instead of remaining constant, will be changed at each movement, in accordance with a given law.

For example, the squares of numbers follow each other in a certain series.

	1st diff.	2d diff.
$1^2 = 1$		
$2^2 = 4$	3	
$3^2 = 9$	5	2
$4^2 = 16$	7	2
$5^2 = 25$	9	2

The difference between the square of 1 (1) and the square of 2 (4) is 3; that between the square of 2 (4) and the square of 3 (9) is 5, etc. These are called *first* differences; the differences between these first differences, are in all cases 2; these are called *second* differences.

In the same way, the cubes of a regular series of numbers have a constant *third* difference, which is 6.

	1st diff.	2d diff.	3d diff.
$1^3 = 1$			
$2^3 = 8$	7		
$3^3 = 27$	19	12	
$4^3 = 64$	37	18	6
$5^3 = 125$	61	24	6
$6^3 = 216$	91	30	6

If, therefore, a machine is so arranged that the number 6, being set up, is added at each movement of the machine to the former second difference, and the resulting sum to the first difference, and that again to the number already indicated by the machine, a list, or table of *cubes* will be computed by the machine.

A machine so arranged is called a "Difference Engine," for the purpose of identifying it; but in reality, a counter is also a difference engine, although it adds only a constant and not a varying number to the number last recorded.

The formula for almost any series of numbers which follows a general law, can be brought into a form which permits computation by the addition of a difference made up of 2d, 3d, 4th — n th, differences, up to any number and a machine is therefore competent to compute such a series.

In a machine made for such a purpose the difference of every order, 1st, 2d, 3d, etc., must be computed by a separate portion of the machine; such portion is called an "element;" therefore a machine for computing a series requiring differences of the 6th order, must be composed of six elements, in addition to the first, or recording, element. These elements are all alike, and are so connected that a single movement of the machine causes them all to act on each other and to register the result on the recording element. If this recording element is provided with type wheels, a wax *diché* can be made from the type wheels, from which *diché* an electrotpe to be printed from can be made, so that the table is computed and prepared for the printer by the machine without the intervention of any action of the mind.

If the machine is in perfect order, all the terms of the series so computed will be absolutely correct, and their correctness can be checked by the independent computation on paper of single terms at intervals of fifty or one hundred terms.

The Grant machine consists of ten elements (I believe that there are ten in the box) similar in design, but differing somewhat in detail; those elements the latest made being the most nearly perfect in their construction. Grant's intention was, had he been able to finish the machine, to have suppressed two or three of those earliest made and to have made better elements in their place.

My impression is that there is no part of a printing apparatus in the box. There is no mathematical question involved in the construction of a printing apparatus, but there are mechanical difficulties in the way of making one which will give a result comparing favorably with the printed tables we are in the habit of using.

Several large "Difference Engines" are in existence; that best known is Babbage's engine, now in the South Kensington Museum in London. This was not sufficiently completed to be of practical use. (A description and drawing of this engine is in Babbage's *Passages from the Life of a Philosopher*.)

There are two Swedish engines: one, I believe, is now in Sweden; the other is at the Dudley Observatory, Albany, United States. They have both been used for the computation of tables. The Albany engine has some mechanical defects, and, if my memory serves me, it has no printing apparatus, the successive terms as they appear on the recording wheels being copied in manuscript by the attendant.

The United States Coast and Geodetic Survey possesses a beautiful machine, "The Ferrel Tide Computing Engine," which is in constant use for the preparation of the Tide Tables published by the Coast Survey Office. Made for those special computations, it differs widely from the engines above noted.

In a public institution like the University of Pennsylvania, and in the hands of some one interested in its working, a good "Difference Engine" could be usefully employed in the preparation and publication of tables for use in all kind of computations. Tables of squares, cubes, areas, logarithms, etc., are in every one's hands, and the number of useful tables could be largely increased could they be computed and printed with cheapness and accuracy.

If the Grant engine could have been finished, my intention was to have presented it to the University in the hope that in charge of some one of the professors, of mathematics for instance, it might be usefully employed. The mathematical problems of the machine having been worked out by Grant, whose mathematical attainments are of a high order, I should probably, had I remained in Philadelphia, have undertaken to have the machine completed under my supervision.

I cannot do that now, and I can only ask that it may be kept at the University until possibly some one there may feel an interest in examining it. There may be a collection of similar apparatus in some part of the University, in which it could be placed after being taken out of its box; or if it were deemed advisable to place it in the Library or elsewhere, I should be glad to pay for a glass case in which it could be safely kept. I would like to see some such disposition made of it, since it represents a great deal of thought and work spent on it by Grant, and represents a portion of the history of such inventions.

(Signed) FAIRMAN ROGERS.

PROCEEDINGS OF THE CORPORATION.

At a stated meeting held on December 6, the following business was transacted:

Appointments were confirmed as follows: Augustus O. Koenig, D. D. S., Demonstrator of Dental Metallurgy; William R. Nicholson, M. D., Assistant Demonstrator of Obstetrics; George Fetterolf, M. D., T. Turner Thomas, M. D., and Robert P. McReynolds, M. D., Assistant Demonstrators of Anatomy; B. Franklin Stahl, M. D., Lecturer on Dietetics. Thanks were voted to Mr. Charles E. Claghorn for a valuable collection of architectural photographs; to Miss Tate, for a fossil specimen; to Princeton University, Rev. T. A. Shanahan, Dr. Horace Jayne, Dr. W. M. Staltz, Mr. Richard L. Ashhurst, Mr. Louis C. Madeira, Jr., and to Mr. Eugene Ellicott, for gifts to the Library; to the several donors of funds reported; and to Mr. John B. Gest, for his services in appraising the funds of the George Leib Harrison Foundation.

NOTES.

Finance and Economy.

A conspicuous feature in the meeting of the American Economic Association at New Haven in Christmas week will be the report of the committee on the census. At the last

session of the Association a committee, consisting of Hon. Carroll D. Wright, and Professors Dewey, of the Massachusetts Institute of Technology; Willcox, of Cornell; Falkner, of Pennsylvania; and Mayo-Smith, of Columbia, chairman; was appointed to consider the needs of the federal census of 1900. The committee has invited the co-operation of economists and statisticians throughout the country, and the result is a series of papers on the various aspects of census work, which will form an invaluable guide to the census. The papers take up various branches of statistics, and discuss the methods of the preceding census with a view to discovering the most effective organization of census work in the future. It is proposed to print the reports, which will probably make a volume of three hundred pages. The University will be represented in this document by papers on the statistics of "Crime and Prison," by Professor R. P. Falkner; on statistics of "The Defective and Dependent Classes," by Professor S. M. Lindsay, and statistics of "Transportation," by Professor E. R. Johnson and Dr. W. E. Weyl.

The Seminary in Economic and Political Science has been organized under a committee consisting of Professors Adams, Falkner, and Patten, chairman. It is attended by all graduate students taking major or minor work in Politics and Economics, as well as by the instructors in these studies. The subject of "Colonies" has been selected for the year's work, and papers have already been presented on "The Expansion of the United States," "The Types of Colonies," "The Results of the Late War," "The Administration of Colonies," and "The Success of Different Nations in Colonial Enterprise." Other topics of a like general character will be discussed during the year.

The public lectures given to students in Finance and Economy have been resumed during the current year. So far valuable addresses have been delivered by Mr. John W. Martin, of London, on the "London County Council;" Mr. Joseph Wharton, of Philadelphia, on the "Tariff Legislation;" Professor F. H. Giddings, of Columbia University, on "Certain Aspects of the War with Spain;" Professor Lindley M. Keasbey, of Bryn Mawr, on the "Nicaragua Canal;" and the

Hon. Martin A. Knapp, Chairman of the Interstate Commerce Commission, on the "Federal Regulation of Interstate Commerce."

Under the auspices of a committee composed of the deans of three theological seminaries in Philadelphia, and with the consent of the authorities of the University, Professor S. M. Lindsay is giving this winter a course of lectures, one hour per week, to a class of over one hundred students. The class has been divided for convenience into two sections, one of which meets in College Hall, and the other in the chapel of the Mt. Airy Theological Seminary. Seven clergymen of the city and a number of outsiders engaged in practical work are in attendance, in addition to the divinity students assigned by the several seminaries. This co-operative experiment is the first definite attempt on the part of the theological seminaries in this vicinity to meet the growing demand for sociological instruction on the part of their students. In all cases the results of the work done by the students as tested by examination will be reported to the seminary authorities, and will be taken into account in making up the records of the standing of their students. The following is an outline syllabus of the topics covered in this course:

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| I. | { | 1. The Meaning of Sociology. |
| | | 2. The Methods of the Social Sciences. |
| | | 3. Sociology and Economics. |
| | | 4. Sociology and Politics. |
| (THEORETICAL.) | { | 5. The Applications of Sociology. |
| | | 6. The Beginnings of Social Theory. |
| | | 7. Social Utopias. |
| | | 8. The Older Socialism. |
| | | 9. Modern Socialism and the Social Movement. |
| | | 10. Colonial Population of the United States. |
| | | 11-13. Early Social Life of the United States. |
| | | (a) New England. |
| | | (b) Middle States. |
| | | (c) The South and West. |
| II. | { | 14-16. Environment in Relation to American |
| | | (a) Standards. |
| | | (b) Ambitions. |
| (ANALYTICAL.) | { | (c) Control. |

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| III.
(PRACTICAL
ILLUSTRATIVE
APPLICATIONS.) | { <ul style="list-style-type: none"> 17. Improved Housing of the Poor, and Tenement House Life. 18. Public Sanitation. 19. Public Education. 20. Social Settlements. 21. Clubs and Societies. 22-24. Family Life. <ul style="list-style-type: none"> (a) Woman's Public Activity. (b) The Home. (c) Child Sociology. 25. Final Examination and Written Review.
 (Optional, for "hearers.") |
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Languages.

The second monthly meeting of the Language Union was held on Tuesday afternoon, December 6. There was a large attendance of those teaching languages in the various departments of the University, of graduate students, and of undergraduates of the upper classes. Professor Alfred Gudeman read a paper on the "Sources of Plutarch's Life of Cicero," an abstract of which will be found elsewhere in these pages. After a brief criticism by Professor W. A. Lamberton, which was replied to by Professor Gudeman, Professor F. E. Schelling exhibited a diagram setting forth a scheme of classification for the dramatic phenomena of English Literature from the mystery plays to the closing of the theatres in 1642; and read a paper explaining some of the lines of development and giving some of his results.

PROCEEDINGS OF THE GRADUATE BIOLOGICAL CLUB.

On November 2, 1898, at a meeting of the Biological Club, the following programme was given: Dr. C. M. Burk read a paper on "The Anatomy of the Hip Joint with Reference to Hip Disease." The paper referred to the action and interaction of the various muscles, bones and ligaments which make up the joint, and demonstrated that toxic principles frequently so modified the normal action of these as to cause hip disease. Dr. A. F. Witmer presented a boy suffering from aphasia, and so experimented upon him as to demonstrate the kind of aphasia from which he was suffering.

On December 5, Miss Mary E. Marvin read a communication entitled "The Training of a Defective Child for Fifteen Months." She showed conclusively that much could be done in improving the physical

and mental condition of a child suffering from catalepsy by methods of instruction suited to the case. Dr. J. W. Harshberger spoke on his impressions of the German botanical institutes at Bonn, Berlin, Dresden and Munich. Mr. R. J. Murlin reviewed a recent paper by Carnoy, in which strong stand was taken against the accepted views concerning the theories of fertilization propounded by Van Beneden and Boveri. Mr. R. E. B. McKenney displayed some interesting plants from the University greenhouses.

The meeting of December 19, was of exceptional interest. Miss Amelia Smith presented her original work on the "Structure and Parasitism of *Aphyllon uniflorum*." Dr. T. H. Montgomery showed specimens of *Dreissensia* from the Naples Zoological Station, and Dr. J. M. Macfarlane showed, under the microscope, slides illustrating cell-division in the onion. Several mice killed by *Favus* were displayed, and the disease explained by Dr. M. P. Ravenel as being due to a fungus (*Achorion Schoenleinii*). A discussion followed on fertilization in *Ascaris* and other types.

ABSTRACTS OF RECENT PAPERS.

Studies in the Evolution of Dramatic Species from the Beginnings of the English Drama to the Year 1660.

FELIX E. SCHELLING.

[Read before a meeting of the Language Union, December 6, 1898.]

The purpose of the investigations, some of the results of which were set forth in this paper, are as follows: To determine the evolution of the species of dramatic composition within the period just mentioned; to ascertain, as nearly as possible, the character of each play and refer it to its type; to establish its relation to what had preceded and what was to follow; to learn definitely when a given dramatic variety appeared, how long it continued, and when it was superseded by other forms of the drama.

The phenomena examined have been the corpus of extant plays (including plays in Latin and English translations of foreign plays) from the Mysteries to Shirley; the word "play" being interpreted liberally to include masques, pageants, dramatic closet plays like Greville's and the Countess of Pembroke's, and even dialogues and other quasi-dramatic compositions. Besides this a diligent attempt has been made to find every contemporary mention of a play or dramatic performance, every allusion, to a play, now no longer extant, in contemporary records, such as the "Register of the Stationers' Company," the "Diary of Henslowe," contemporary letters, books, legal documents, etc.; to tabulate these allusions, and to take them into consideration in combining results. This work was reported as being as yet far from complete, for the work com-

bines with this inspection of original material, an equally attentive study of what workers in individual fields have already accomplished, and a long list of MSS. to be examined, unpublished (or at least un-republished), plays to be read, and theories noted.

The paper continued: There are several things which it is desirable to know about a play. We want to know (1) its title, (2) its author, if possible, though this is not always so important a question as might be supposed. (3) We want to know the date of the writing of a play, its first presentation, including the company which acted it and the theatre at which it was produced. (4) We inquire into the source of the story, if it be not invented (an exceedingly rare exception to the usual Elizabethan practice); and we study (5) its dramatic construction in its conformity or divergence from regular dramatic types, consider the number and character of its plots, and their relation to each other. (6) Once more, we must take into consideration the literary style of each play, the mode of expression employed, and the versification, if written in verse. (7) Lastly, we must consider the constitution of each play as to mixed or simple elements and the class and species of the drama to which it may in consequence be assigned. To illustrate:

"The Chronicle History of Henry the Fifth with the Battle Fought at Agincourt in France," was written by Shakespeare between March and September, 1599, acted presumably at the Globe, then newly erected, by the Lord Chamberlain's Company in the same year, and published in the year following. The immediate source is "The Famous Victories of Henry the Fifth containing the Honorable Battle of Agincourt," a play attributed by some to Richard Tarlton, the celebrated comedian, written between 1580 and 1588. In subject the later play follows the career of King Henry to his marriage and crowning at Paris, lightened by the infusion of certain comedy elements in such characters as Fluellen, and in such episodes as that of Williams and the king's glove. The mode of expression is that of the height of the Elizabethan age, the species, "English Chronicle History," distinguishable from "King Lear" in dealing with actual rather than with mythical or legendary national history. We have here a drama possible only as the result of a long evolution from the past. What was that evolution? And what came after?

"Henry the Fifth" is a specimen of a class of dramas extremely popular during a period extending from 1562, the date of the performance of *Gorboduc*, to 1604, in which year two plays were performed in which Elizabeth, recently dead, was presented on the stage. If we go back to originals, we find that as early as the first decades of the fifteenth century, pageants in honor of England's patron saint, George, were celebrated, and mock battles commemorating the English overthrow of the Danes formed, for years thereafter and until Elizabeth's reign, a popular amusement in Shakespeare's own county of Warwickshire. Later, in Bale's "King Jolian, 1538, an English sovereign is for the first time represented on the stage, and fifty years after begins a long series of plays in which the legendary history of England, the stories of Merlin,

Arthlur, Gorboduc and Lear; the actual deeds of English kings, such as Richard Cor de Lion, the Edwards and the Henrys, or of English heroes of Folk Lore, such as Robin Hood, or Guy of Warwick, are celebrated in dramatic form. There is no English king from Edward the Confessor to Elizabeth who was not celebrated in this way, some of them again and again. Elizabeth is the last, except for certain satirical representations of King James, and the English National Historical Drama actually ends precisely where we might have supposed it would end, with the decay of the national spirit on the coming of a pedantic and unpatriotic foreigner to the throne. Subsequent dramas of this class are rare, Ford's "Perkin Warbeck" and Fletcher's "Bonduca" being among them; both of these dramas are romantically treated, the choice of subject being doubtless accidental. Precise data were then given as to the extent and the character of this class of Elizabethan dramas, all of which will be published when these investigations are mature; and this single class was quoted only as an illustration of the scope and method to be pursued for the entire subject.

Then followed an explanation of the tabular representation of the subject setting forth the system of classification pursued and defining certain lines of development. The following amongst many points, which this investigation may establish, may be cited, some for their novelty, others for the more certain basis upon which this study may (it is hoped) place them. It has long been known that the drama arose out of one form and grew toward greater complexity. These investigations show:

1. That this complexity increased to a remarkable degree in the earlier experimental days of Elizabeth, and increased up to the end of her reign; but that after the accession of James not a single new species of drama appeared, though every species that existed was in process of modification.

2. That the prevalent notion which affirms that the English drama is wholly exotic in its sources is false, and that a plainly distinguishable English vernacular drama exists from interlude times.

3. That there is not a drama of Elizabeth's reign coming under the Religious or Popular Influences, the germ of which is not more or less clearly discernible in the Morality.

4. That by the accession of Charles I., leaving out of consideration the Masque, the drama had practically worked itself out into but two species: the Romantic Drama and the Comedy of Manners.

5. That the Restoration Heroic Play is referable directly (but with an infusion of a revived influence from the Heroic Romance) to the drama of Shakespeare.

6. That the Restoration Comedy of Manners traces its ancestry to the Vernacular English Drama on the one hand and to the Comedy of Humors and Manners showing a classical influence on the other, though strongly affected, as is the Romantic Drama by contemporary foreign models.

7. That the Elizabethan stage represented far more commonly and

generally than is usually supposed, not only contemporary English happenings, as the murders of Calverley, the Late Lancashire Witches, the life of Roaring Moll, or the deeds of Queen Elizabeth now scarcely laid in her grave, but likewise interested itself in the events of contemporary foreign history, and in satire, personal and political, emulating in its kind the comedy of Aristophanes.

8. That along side of the popular drama of the public theatres, there existed for years a drama of a distinctive type, the Court Drama, whose affiliations were Italian and classical and which descended from Lyly and Peele to Daniel, and in its union with the earlier Masque Interlude, begot the later elaborated Masques of Jonson and Shirley.

9. That equally aloof from the popular drama there existed a series of Elizabethan closet plays, written for the delectation of their authors and their author's friends and never intended to be performed.

10. That leaving out of consideration the several survivals in regular dramatic form of the earlier Religious Drama, the drama of this age manifested itself in a complexity and with a variety, which lay under contribution every accessible store of history, fiction, mythology, classic and folk-lore, philosophy and statecraft.

Lastly, that barring a few dramas in MS. or in single impressions, remaining locked up in private collections in England, it is quite possible to study this series of literary phenomena in its entirety and to weigh it as a whole. And that such a study properly conducted, with due deliberation, to its close ought to cast a new and illuminating light, not only on the dramatic relations of the time, but upon the whole history of English literature.

The Sources of Plutarch's Life of Cicero.

ALFRED GUDEMAN.

[Read before the Language Union, December 6, 1898.]

Owing to the neglect of certain fundamental methodological principles on the part of those who have examined into the sources of Plutarch, and of his life of Cicero in particular, the speaker, before entering *in medias res*, emphasized the following prerequisite modes of procedure:

We must, first of all, endeavor to secure an adequately clear conception as to what kind of a writer Plutarch was. What was the purpose of his biographies, what historiographical principles, if any, did he profess or practice, what was the range of his erudition, what were his predilections and prejudices and idiosyncrasies? To what extent, finally, did his knowledge of Latin enable him to read with requisite intelligence Roman writers, where these constituted his only sources of information?

After a discussion of all these questions the speaker pointed out that the next prerequisite step in investigations of this nature was the determination of all the sources which may possibly have been available to Plutarch, and what was the character of these works. For the life of

Cicero he enumerated the following as the most important: Cicero's own works, Sallust's *Catiline*, Tiro's, Népos', Suetonius' *Vita Ciceronis*, and Livy. In the consideration of these, barring Suetonius, who had never been thought of as a possible source of Plutarch,* scholars proceeded on the conviction that coincidences between Plutarch and some extant author furnished a sure clue to indebtedness. This method, however, is wholly wrong and deceptive. Coincidences can justify such an inference, only if they are of a very peculiar nature or demonstrably erroneous, and even in the latter case the error may at times be due to a common third source. But even where the resemblances are very striking, such indebtedness will be out of the question, if they are found side by side with equally palpable divergencies. In the case of non-extant authors interdependence cannot be assumed, if the particular statements in question conflict with the known character of the earlier work, or are of a nature such as a contemporary *e. g.* could not, for one reason or another, have been guilty of.

With these cardinal principles as a guide, the speaker demonstrated that, contrary to the unanimous opinion of scholars, Plutarch cannot possibly have used or read any of the Latin works of Cicero nor Sallust; that Cicero's Greek memoir on his consulship was not as extensively consulted as has been believed; that there are numerous statements which betray, though hitherto unsuspected, a post-Augustan origin, and that one of the chief sources of these is Suetonius.

The completed paper will furnish not only the negative proof of non-indebtedness referred to; but will also attempt to distribute, as far as possible, the information collected by Plutarch among a number of sources of which he demonstrably did make use.

THE NEW LAW SCHOOL BUILDING.

The erection of the new Law School Building will begin (weather permitting), before the first of January. The total cost of the enterprise, one of the largest ever undertaken by the University, will be (exclusive of the cost of the ground), about \$300,000. The material of the exterior will be Indiana limestone and dark, dull red brick, with a roof of green slate. The construction will be entirely fire-proof, and in the finishing little wood will be used, even the fire-proof floors being surfaced with marble or cement.

The building will face on Thirty-fourth street, abutting

*The proofs of Plutarch's indebtedness to Suetonius' *Vita Ciceronis* will be found in the Transactions of the Amer. Philol. Assoc., vol. xx (1889), pp. 139-159, to which the present paper will now add still further confirmatory evidence.

north and south on Chestnut and Sansom streets. The Sansom street entrance will lead into a lower hall, from which open eleven club and quiz rooms, a large bicycle-room, and a wide stairway up to the main central hall on the first floor.

The main entrance will be in the middle of the Thirty-fourth street front, through a spacious vestibule into the entrance hall, on the right and left of which lie the Dean's offices and the coat-rooms. Beyond these will extend, north and south, the great central hall—a vaulted room, twenty-seven feet wide and one hundred and twenty feet long, surrounded by the lecture rooms. These will be seven in number, varying in size from a seating capacity of fifty to two hundred and fifty students. Beside the lecture rooms there will be a practice court, with its adjoining Prothonotary's office—a novel arrangement in law schools, but one which is destined to become a necessary part of any building devoted to the study of law, according to the modern method.

In the centre of the west side, opposite of the entrance hall, will be the grand staircase, built of marble and rising in a stair hall thirty-eight feet by forty feet, and forty feet high. The walls of the halls will be broken by pilasters and richly ornamented doorways. In the spaces between these will be placed busts and memorial tablets of distinguished jurists. On the walls of the stair halls and lecture rooms will hang the portraits of celebrated lawyers and judges, of which the Law School already possesses a valuable collection.

The lavatories are placed in a mezzanine floor midway between the lecture room and library floors. There will also be large vault rooms for the filing and storage of documents, as well as engine, dynamo, fan rooms, etc., in the basement.

The architects have designed the building on a plan that makes the library scheme its central idea. The books have been put in the heart of the building to facilitate their distribution and use. The second, or library floor, will be devoted entirely to the stack room and reading rooms. The stack room lies in the centre of the building, directly over the large hall, and is enclosed completely from the rest of the rooms by heavy brick walls and double fire-proof shutters at its entrances. It rises over fifty feet to a glass roof. The book stack will have

for the present but two tiers of shelves—sufficient for the present library of 25,000 volumes—but this can be increased at any time by successive galleries until the capacity reaches 100,000 to 120,000. Adjoining the stacks at the north and south ends are the two under graduate reading rooms. These two rooms will each be forty by one hundred and fourteen feet, and thirty feet high. They will be lighted by large mullioned windows on three sides, and will be decorated with pilasters supporting an ornamented cornice and vaulted ceiling. Each student will have a separate desk in one of these two rooms assigned to him. The need for a quiet place of study which a student can call his own, and which no one but himself may occupy, is at present much felt by the students of the Department; and it is believed by the Faculty that this system of separate desks in the library reading room will be much appreciated.

The graduate reading room, thirty feet by fifty-four feet, adjoins the book stack on the east, and is flanked by eight small private rooms for the professors. This room will be used only by advanced or special students, by professors, or by members of the bar to whom the freedom of the library is extended for the purpose of special work or research. It will be furnished with thirty-two large tables. No pains will be spared to make the great collection of law books owned by the Department, and known as the "Biddle Library," accessible, not only to the University student, but also to members of the bar and the public generally.

Publications

OF THE

University of Pennsylvania

Group I.—Annual Publications.

University Catalogue (published in December).

Fasciculi of the Departments of Philosophy (Graduate School), Law, Medicine, Dentistry and Veterinary Medicine; also Circulars of Information concerning courses offered in the College: No. 1 (School of Arts); No. 2 (Towne Scientific School); No. 3 (Courses for Teachers).

Report of the Provost (published in January).

Group II.—Serial Publications.

Series in Philology, Literature and Archæology.

Series in Philosophy.

Series in Political Economy and Public Law.*

Series in Botany.

Series in Zoology.

Series in Mathematics.

Series in Hygiene.

University Bulletin (monthly).

Group III.—Occasional Publications.

Reports of the Museums of Archæology and Paleontology.

Theses presented for the Degree of Doctor of Philosophy.

†Group IV.—Affiliated Publications.

Annals of the American Academy of Political and Social Science.

Americana Germanica (quarterly).

Bulletin of the Free Museum of Science and Art.

Translations and Reprints from the Original Sources of European History.

American Law Register.

EXPLANATORY.

Group I consists of publications issued annually under the direct auspices of the Provost and Trustees.

The University Catalogue is a volume of about 500 pp. It contains detailed information concerning all departments, lists of officers and students, with addresses, etc. No charge is made for the Catalogue, but in all cases requests for a copy by mail must be accompanied by ten cents in stamps to cover postage.

The Fasciculus of each department contains information concerning that department *only*; while the three College Circulars of Information, covering respectively the School of Arts, the Towne Scientific School,

* Beginning with New Series, No. 1.

† For exchange purposes only.

and the Courses for Teachers, are in like manner restricted as to their contents. The Fasciculi and College Circulars are published separately after the University Catalogue, of which they are, to a large extent, reprints. Single copies are mailed free upon request.

The Report of the Provost, made by him annually to the Corporation, constitutes a general review of University activities during the year, and contains *inter alia* reports from the Treasurer and the several Deans. Single copies are mailed free upon request.

Group II consists of a number of serial publications in the several fields of literature, science and philology. They are issued in separate series at irregular intervals (for the most part), and represent the results of original research by, or under the direction of, members of the staff of instruction of the University. A complete list of these publications to date, *with prices attached*, is printed at length following. They are published under the editorial supervision of the University Publications Committee.

Group III consists of occasional publications, such as reports of the various University departments (where printed separately), and certain theses presented in partial fulfillment of the requirements for the degree Doctor of Philosophy.

Group IV consists of affiliated publications, issued as separate periodicals, not under the control of the University, but edited in part by officers of the University of Pennsylvania. Copies are obtainable from the University only through the medium of exchange (see Exchange Bureau, below).

EXCHANGE BUREAU.

The University of Pennsylvania desires to extend its system of exchanging publications with other similar institutions and learned societies, both at home and abroad.

For convenience in correspondence, the following statement is made:

To those educational institutions and learned societies which issue only annual catalogues, reports, or similar publications, the University of Pennsylvania offers in exchange all those of its own publications classed under **Group I** and **III**, or as many of them as may be specified.

To those educational institutions and learned societies publishing *also* results of original investigations, the University of Pennsylvania offers in exchange any one of its equivalent series in **Groups II** and **IV**, or as many of them as may be mutually agreed upon in order to maintain a proportionate ratio of exchange.

In establishing a system of exchanges with any other institution, the University of Pennsylvania binds itself to the following regulations:

All publications agreed upon to be forwarded from Philadelphia to address furnished, immediately upon issue, free of expense to our correspondent.

In return the University requests compliance with the following:

All publications to be forwarded to "Library of the University of Pennsylvania, Philadelphia, Pa.," marked "Exchange Bureau" in lower left-hand corner, immediately upon issue, free of expense to us.

Orders for single numbers, or sets of Serial Publications under **Group II**, and all correspondence relating to the publications of this University, should be addressed to

J. HARTLEY MERRICK, *Assistant Secretary*,
Station B, Philadelphia, Pa.

Philology, Literature, and Archæology

Volume I.

1. **Poetic and Verse Criticism of the Reign of Elizabeth.** By FELIX E. SCHELLING, Professor of English Literature. \$1.00.
2. **A Fragment of the Babylonian "Dibarra" Epic.** By MORRIS JASTROW, JR., Professor of Semitic Languages. 60 cents.
3. *a. Πρὸς with the Accusative. b. Note on a Passage in the Antigone.* By WILLIAM A. LAMBERTON, Professor of the Greek Language and Literature. 50 cents.
4. **The Gambling Games of the Chinese in America: Fán t'án and Pák kòp piú.** By STEWART CULIN, Curator of the Museum of Archæology and Paleontology. 40 cents.

Volume II.

1. **Recent Archæological Explorations in the Valley of the Delaware River.** By CHARLES C. ABBOTT, Sometime Curator of the Museum of American Archæology. 75 cents.
2. **The Terrace at Persepolis.** By MORTON W. EASTON, Professor of English and Comparative Philology. 25 cents.
3. **The Life and Writings of George Gascoigne.** By FELIX E. SCHELLING, Professor of English Literature. \$1.00.

Volume III.

1. **Assyriaca.** By HERMANN V. HILPRECHT, Professor of Assyrian and Comparative Semitic Philology, and Curator of Babylonian Antiquities. \$1.50.
2. **A Primer of Mayan Hieroglyphics.** By DANIEL G. BRINTON, Professor of American Archæology and Linguistics. \$1.20.

Volume IV.

1. **The Rhymes of Gower's *Confessio Amanti*.** By MORTON W. EASTON, Professor of English and Comparative Philology. 60 cents.
2. **Social Changes in the Sixteenth Century as Reflected in Contemporary English Literature.** By EDWARD P. CHEYNEY, Assistant Professor of History. \$1.00.
3. **The War of the Theatres.** By JOSIAH H. PENNIMAN, Instructor in English. \$1.00.

Volume V. \$2.00.

- Two Plays of Miguel Sanchez (surnamed "El Divino").** By
HUGO A. RENNERT, Professor of Romance Languages and Literatures.

Volume VI. \$2.00.

- a. The Antiquity of Man in the Delaware Valley.**
b. Exploration of an Indian Ossuary on the Choptank River, Dorchester Co., Md. With a description of the crania discovered by E. D. Cope; and an examination of traces of disease in the bones, by Dr. R. H. Harte.
c. Exploration of Aboriginal Shell Heaps on York River, Maine. By HENRY C. MERCER, Curator of the Museum of American Archaeology.
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Philosophy

- 1. *Sameness and Identity.** By GEORGE STUART FULLERTON.
2. *On the Perception of Small Differences. With special reference to the Extent, Force, and Time of Movement. By GEORGE STUART FULLERTON and JAMES MCKEEN CATTELL.
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Political Economy and Public Law

†Volume I.

- 1. *The Wharton School Annals of Political Science.** March, 1885.
2. The Anti-Rent Agitation in the State of New York. 1839-1846. By EDWARD P. CHEYNEY.
3. Ground Rents in Philadelphia. By EDWARD P. ALLINSON and B. PENROSE.
4. The Consumption of Wealth. By SIMON N. PATTEN.
5. Prison Statistics of the United States for 1888. By ROLAND P. FALKNER.
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7. *The Federal Constitution of Germany. With an historical introduction, translated by EDMUND J. JAMES.
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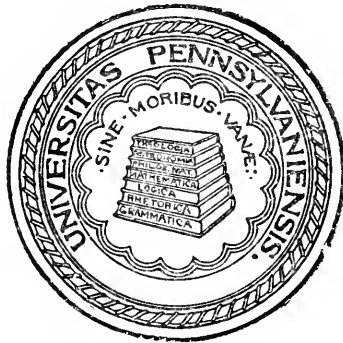
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Publications
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**TWO HISTORICAL DOCUMENTS CONNECTED WITH THE EARLY
HISTORY OF THE UNIVERSITY.**

Two documents of much historical interest are now on exhibition in the University Library. Both were presented to the University by Dr. S. Weir Mitchell, one some years ago, and the other more recently. They are the two letters authorizing Provost William Smith, representing the "College, Academy and Charitable School of Philadelphia in the Province of Pennsylvania" (now the University of Pennsylvania), and James Jay, representing the "College of the Province of New York" (now Columbia University), to receive the proceeds, share and share alike, of a public collection of funds for their respective institutions, throughout the realms of His Majesty King George the Third. These letters are practically identical, and bear date respectively 13 May, 1763, and 13 April, 1764. The former constitutes William Smith and James Jay the receivers of all moneys obtained by John Byrd, John Hall and John Stevenson, Deputy Collectors; while the latter constitutes Thomas Penn and Barlow Trecothick receivers (on behalf of William Smith and James Jay) of other moneys obtained by the said Byrd, Hall and Stevenson (being the balance of the collection). On the backs of these two documents are transcribed the receipts for the various sums turned over to the two collectors.

This joint collection on the part of William Smith and James Jay was not premeditated. During the period just preceding the year 1761, the trustees of the College, Academy and Charitable School found themselves exceedingly hard pressed for funds; and, having cast about for some reliable means of raising money to continue and develop the institution, they determined to send some one to Eng-

land to undertake a collection. This determination was reached as the result of a report made to the trustees by a sub-committee, consisting of Richard Peters, Thomas Willing, William Cox and Alexander Stedman, under date of 27 November, 1761. The concluding paragraph reads as follows:

"We therefore most heartily recommend it to the Trustees to take this Matter into their immediate & most serious Consideration & to engage some proper person to go over to England with all convenient Expedition and furnish him with proper Recommendations & Credentials in order to solicit the Benevolence of the Good people of Great Britain for such further Support of the Institution as that it may be put upon a footing sufficient to maintain for ever an expedient Number of Professors Masters and Tutors as well as to enable the Trustees to make such additional Buildings as will obviate the Objections made to the Institution in its present form for want of Lodging & Superintending the Morals of the Students."

In accordance with this report, therefore, the trustees selected the Provost, Dr. William Smith, as their agent, and requested him "with all convenient speed to undertake a voyage to England for the purposes above mentioned." When Dr. Smith reached England, he found that Dr. James Jay, in behalf of the College of the Province of New York, was preparing to undertake an errand similar in purpose to his own; whereupon the two gentlemen wisely concluded to join together in their appeals, and to divide the proceeds.

In order that no effort might be left untried, the trustees of the College and Academy addressed a letter under date of 15 December, 1761, to Thomas Penn, Proprietary of the Province of Pennsylvania, beseeching him to lend such aid and support to Dr. Smith as would enable him the more effectually to prosecute his collection. A reply was received from Penn, who was at the time in London, under date of 11 August, 1762, promising to do all in his power to help the College. It was chiefly, however, through the influence of the then Archbishop of Canterbury that the two petitioners were successful in

obtaining the King's sanction to their enterprise. The "Fiat" for the * Royal Brief is as follows:

("Order in Council" to the Lord High Chancellor to draw up Letters Patent authorizing the collection of funds for the joint benefit of the College, Academy and Charitable School in Philadelphia and the College of the Province of New York.)

AT THE COURT OF ST. JAMES THE 12TH. DAY OF
AUGUST 1763.

The King's most excellent Majesty in Council.

Whereas there was this day read to his Majesty at this Board the joint Petition of William Smith, Doctor in Divinity, Agent for the Trustees of the College, Academy and Charitable School of Philadelphia in the Province of Pennsylvania, and Provost of that Seminary; and of James Jay, Doctor in Physic, Agent for the Governors of the College of the Province of New York in the City of New York in America, setting forth—That the great growth of these Provinces and the continual accession of people to them from the different parts of the world, being some years ago observed by sundry of his Majesty's good subjects there, they became seriously impressed with a view of the inconveniences like to arise among so mixed a multitude, if left destitute of the necessary means of instruction, differing in Language and Manners unenlightened by Religion, uncemented by a Common Education, strangers to the humane Arts, and to the just use of Rational Liberty.

That these considerations were rendered the more alarming by sundry other circumstances, and particularly the amazing pains which Popish Emissaries were everywhere perceived to take for the propagation of their peculiar tenets, and the many establishments which they were making for this purpose in all parts of America belonging to them; while his Majesty's numerous subjects there, and particularly in the two important and central Provinces aforesaid remained too liable to their corruptions by being spread abroad on a wide frontier, with scarce a possibility of finding a sufficient supply of Protestant Ministers and Teachers for them, so long as opportunities were wanting to educate them there, and but few men of proper qualifications here could be induced to exchange their hopes in these kingdoms for a laborious employment in a remote wilderness where they were to expect but small secular advantage to reward their toil.—That these inconveniences began to be greatly felt not only by the Society for Propagating the Gospel in foreign Parts, but also by the various denominations of other Protestants in his Majesty's Colonies, so that the good purposes which they severally had in view for the support and extension of the Reformed Religion in these remote countries were like to be grievously affected by the want of fit persons to send forth as instructors and teachers. That from a deep sense of these growing evils the two Seminaries aforesaid, distant about 100 miles from each

* The Royal Brief bears date 19 August, 1762.

other were begun in two of the most important and popular trading cities in his Majesty's American Dominions, nearly at the same time and with the same view, not so much to aim at any high improvements in knowledge as to guard against total ignorance; to instil in the minds of youth just principles of Religion, Loyalty and Love of our excellent Constitution; to instruct them in such branches of knowledge and useful arts as are necessary to trade, agriculture and a due improvement of his Majesty's valuable Colonies; and to assist in raising up a succession of faithful instructors and teachers to be sent forth not only among his Majesty's subjects there, but also among his Indian Allies, in order to instruct both in the way of truth, to save them from the corruptions of the enemy and help to remove the reproach of suffering the emissaries of a false religion to be more zealous and propagating their slavish and destructive tenets in that part of the world, than Britons and Protestants are in promoting the pure form of godliness and the glorious plan of public liberty and happiness committed to them.

That for the better answering these great and important purposes the aforesaid Seminaries are under the direction of the chief officers of government sundry of the Clergy of different denominations, and other persons of distinction in the respective cities where they are placed, and their usefulness has been so generally felt and acknowledged, that amidst all the calamities of an expensive war near ten thousand pounds sterling have been contributed in each of the said Provinces to their support, and some hundreds of youth continually educated on charity and otherwise; But as designs of so extensive a nature have seldom been completed in the most wealthy kingdoms, unless by the united generosity of private benefactors and often by the particular bounty of sovereign princes, the Petitioners are persuaded it will not be thought strange that all the resources in the power of individuals in young Colonies should be found inadequate to such a work, and that the Governors and Trustees of the said Seminaries should have the just apprehension of seeing all that they have raised for their support speedily exhausted and an end put to their usefulness, unless then can procure assistance from distant places, as the expense of each of them is four hundred pounds sterling yearly above their income; the defraying of which would require an additional capital of above six thousand pounds sterling apiece. That, under such circumstances, at a time when the signal success of his Majesty's Arms in America opens a new field for the advancement of divine knowledge there, and renders the design of such Seminaries more peculiarly important it was hoped that benefactors would not be wanting to give that kind assistance to pious Foundations in his Majesty's Colonies, which has always been so readily bestowed upon every design of a like kind in these kingdoms, and seldom denied to Protestant brethren even in foreign nations—That the Petitioners being accordingly appointed to solicit and receive such assistance, and being sensible that the highest satisfaction which his Majesty's known piety and humanity can derive from the prosperity and extension of his dominions will be to see these advan-

tages improved for enlarging the sphere of Protestantism increasing the number of good men, and bringing barbarous nations within the pale of Religion and Civil Life; they are therefore encouraged humbly to pray—That his Majesty will be pleased to direct that a Royal Brief may be passed under the Great Seal of Great Britain, authorizing them to make a collection throughout the kingdom, from house to house, for the joint and equal benefit of the two Seminaries and Bodies Corporate.

His Majesty taking the same into his royal consideration, and being willing to give encouragement to every design that may tend to the good of his Colonies and the advancement of Religion and Virtue, is graciously pleased, with the advice of his Privy Council, to Order, as it is hereby Ordered—That the Right Honorable the Lord High Chancellor of Great Britain so cause Letters Patent to be prepared and passed under the Great Seal for the collections of the charity of all well disposed persons for the assistance and benefit of the said two Seminaries, according to the prayer of the said Petitioners.

[Signed] W. SHARPE.

Five days subsequent to the issuing of the Royal Brief (24 August, 1762), William Smith and James Jay signed a power of attorney in favor of John Byrd, John Hall, and John Stevenson, as "Brief Layers," or Deputy Collectors, which authorized the latter to act in their stead as receivers of all funds collected.* This power of attorney is here given, as properly antecedent to the publication of the two documents now in possession of the University:

"Whereas, upon the joint Petition of us, William Smith and James Jay, the former of us Agent for the Trustees of the College, Academy and Charitable School of Philadelphia, in the Province of Pennsylvania, and the latter Agent for the Governors of the College of the Province of New York, in the city of New York in America; his Majesty with the advice of his most honble privy council has been graciously pleased to grant his Royal Brief or Letters Patents under the Great Seal for Collecting the Charity of well-disposed Persons from House to House throughout this

* Horace Wemyss Smith, in his *Life and Correspondence of the Rev. William Smith D. D.*, (Phila., 1879), Vol. I, p. 306, in writing of the Royal Brief, comments as follows:
* * * "The object, therefore, now was to make the Brief operative. The original, of course, could not be sent to each one of the eleven thousand five hundred clergymen of every grade in England. The place of the thing had no such purpose. Briefs have a purpose of their own, as well as a purpose for charities. The plan is to send a stamped copy to each of the eleven thousand five hundred of the clergy who are to make the appeal under it. The stamps bring as much to the Crown as the Briefs sometimes does to the charity. Besides this, "Brief Layers" follow all Briefs. The American reader will, perhaps, hardly know what a "Brief Layer" is. He does not know that it would be thought beneath the dignity of a person holding a Royal Brief, especially of a Doctor of Divinity and a Knight, to perform any details incident to it himself. All that must be done by "Brief Layers." * * *

Kingdom for the joint and equal Benefit of the said two Seminaries of Learning and Bodies Corporate; Now, Know all men by these Presents that we do hereby authorise and appoint John Byrd, John Hall and John Stevenson, in the Borough of Stafford, in the County of Stafford, Gentlemen, to cause a sufficient number of the said Briefs or Copies thereof to be printed, and to give a Receipt for the same as the Law directs; and when the said Copies shall be Signed by us or some one of us, we do further appoint the said Persons to see them stamped as the Law directs; and to pay all the Fees for such stamping, and also the expence of the Letters Patents and of the printed Copies thereof, & to bring us an account of the same as soon as possible, in order to have it settled and allowed by us; and we further appoint the said John Byrd, John Hall & John Stevenson to lay down and dispose the said Briefs in all Parishes & Places where the same by the said Letters Patents shall be required to be laid, and to take up and receive back the same together with the money thereupon collected, and to pay the same to the Trustees therein named for the uses aforesaid; deducting out of the same the sum of Six Pence a Parish chapel or meeting for every Brief duly certified and endorsed, which shall by them be collected and received back from all Places (except within the city of London & weekly Bills of mortality and therein the sum of twelve Pence) as the full salary and Charge for Laying down, collecting and receiving back the said Briefs, with the money thereupon collected and the Payment of the same to the Trustees and all other Trouble of management whatsoever. In witness whereof we have hereunto set and subscribed our Hands this twenty-fourth of August, one thousand seven hundred and sixty-two.

{ Signed } "WILLIAM SMITH,
"JAMES JAY."

The two documents referred to in our title are given below *in extenso et verbatim*. As stated above, the two are practically identical, and therefore the portions of No. 2 which differ in reading from No. 1 are bracketed, the alternate readings being given in foot-notes.

“WHEREAS, His present most Gracious Majesty King George the Third by certain Letters Patent under the Great Seal of Great Britain bearing date at Westminster the nineteenth day of August in the second year of His Reign Did upon the joint Petition of William Smith Doctor in Divinity Agent for the Trustees of the College Academy and Charitable School of Philadelphia in the Province of Pennsylvania and Provost of that Seminary and of James Jay now Sir James Jay Knight Doctor of Physick Agent for the Governors of the College of the Province of New York in the City of New York in America Grant to the Governors and Trustees aforesaid a Publick Collection from House to House throughout the kingdom of Great Britain called England and Dominion of Wales

for the joint and equal benefit of the said two Seminaries and Bodies Corporate for the preservation of the Protestant Religion in those Countries And did therein Authorize nominate and appoint us whose names and Seals are hereunto set Together with divers other persons in the said Letters Patent particularly named Trustees and Receivers of the Charity to be Collected by Virtue thereof with power to any five or more of us to give Deputations to Collectors to be Chosen by the Petitioners as therein mentioned and to make and sign all necessary Orders for the due and regular Collection of the said Brief and to dispose and distribute the Money to be Collected by virtue thereof in such manner as might best answer the Ends for which the said Letters Patent were intended As by the said Letters Patent may more at large appear AND WHEREAS five of the said Trustees in the said Letters Patent named Did by a certain Instrument in Writing under their Hands and Seals bearing date the Thirtieth day of April last at the nomination of the said Petitioners Testified by a writing under their Hands and Seals appoint John Byrd, John Hall and John Stevenson of Stafford (in the County of Stafford) Gentlemen Collectors of the said Letters Patent or Brief for the purposes aforesaid And in pursuance thereof they the said John Byrd, John Hall and John Stevenson have Collected and Received divers sums of Money which now remain in their Hands to be accounted for NOW KNOW ALL MEN BY THESE PRESENTS that in Order finally to settle the Accounts of the Moneys Collected or to be Collected by Virtue of the said Letters Patent or Brief and to appropriate the same to the uses in the said Letters Patent mentioned We whose names are here under written being five of the Trustees appointed by the said Letters Patent HAVE in pursuance of the power thereby given us Nominated Constituted Authorized and Appointed and by these presents Do Nominate Constitute Authorize and Appoint And in our place and stead put * [the said William Smith Doctor in Divinity and Sir James Jay Knight Doctor of Physick (the Original Petitioners and Agents for the said Charity) our true and lawful] Attorneys jointly and severally for us and in our names But to and for the uses and purposes in the said Letters Patent mentioned To ask demand and receive of and from the said John Byrd, John Hall and John Stevenson the Collectors appointed as aforesaid their Heirs Executors and Administrators and of and from all other person and persons whom it doth or may Concern All Sum and Sums of Money which have already been Collected or shall hereafter be Collected by them or any of them Or by their or any of their Agents by Virtue of the said Letters Patent and to Examine all and every the Briefs Returns and Endorsements thereof and to state settle adjust and allow the Charges and Disbursements of the said Collectors or any of them in the management of the said Briefs according to an agreement in that behalf made Between the said William Smith and Sir James Jay and Thomas Stevenson and John

* [The Honourable Thos. Penn of Spring Gardens in the County of Middlesex Esquire and Barlow Trecothick Esquire Alderman of the City of London our True and Lawfull]

Stevenson Junr. Agents or Attorneys for the management of the said Briefs under the said John Byrd, John Hall and John Stevenson And upon Receipt of any Sum or Sums of Money or the Ballance of the Accounts from the said Collectors for us and in our Names or in the names of all or a Sufficient Number of the said Trustees acquittances or other Sufficient Discharges for the same to make Sign Seal and Deliver And further to Act do and perform All and every Matter and Thing whatsoever necessary and requisite to be done in and about the Premises [*] And We do hereby promise and Agree to allow ratify and confirm all and whatsoever our said Attorneys [†] shall jointly or severally lawfully do or cause to be done in the premises by Virtue of these presents so long as they shall continue in Great Britain or Ireland— [‡] it being our meaning and intention That when they or either of them shall Embark for America this our Power of Attorney to them shall then cease and determine IN WITNESS whereof we have hereunto set our Hands and Seals this thirteenth day of § [May in the year of our Lord One Thousand Seven Hundred and Sixty three]

¶ [Sealed and delivered by the Archbishop of Canterbury in the presence of CHRIS. HARGRAVE THOS. PARRY	}	THO. CANT.	[L. S.]
Sealed and delivered by the Lord Bishop of London in the presence of WM. DICKES RICHD. NELSON		RIC. LONDON	[L. S.]

* [And we do also Authorize and Impower the said Thos. Penn and Barlow Trecothick or either of them for the purposes aforesaid to make and depute one or more Attorney or Attorneys under them and such Deputies from Time to Time at Pleasure to displace and others to substitute].

† [Their deputies or substitutes]

‡ [for]

§ [April in the year of our Lord One Thousand Seven Hundred and Sixty four]

¶ [Sealed and delivered (being first duly stamped) by the Archbishop of Canterbury in the presence of us JOHN BIRKETT. GEORGE NORTHOVER.	}	THO. CANT.	[L. S.]
Sealed and delivered by the Lord Archbishop of York and the Lord Bishop of Winchester in presence of DAN. BURTON, D. D. EDWD. PEARSON, N. P.		R. EBOR I WINTON	[L. S.] [L. S.]
Sealed and delivered by the Rev. Dr. Chandler in the Presence of JOHN DUNN WILLIAM TATNALL	}	SAM CHANDLER	[L. S.]
Sealed and delivered by the Rev. Dr. Smith in presence of STEPHN. ROE EDWD. CAHILL		WILL. SMITH	[L. S.]

Sealed and delivered by the Lord Bishop of St. David's in the Presence of RICHARD BRADON THOS. ALLEN	}	S. ST. DAVID'S	[L. S.]
Sealed and delivered by Thomas Penn Esqr. in the presence of us DAVID CHEVAUX WILLIAM SALMON	}	THO. PENN	[L. S.]
Seal'd & delivered by Barlow Trew- thicke Esqr. in the presence of us JOHN THOMLINSON JUN. T. APTHORP.]	}	BARLOW TRECOTHICK	[L. S.]

On the back of No. 1 appear the following Receipts:

"23 June 1763 Recd. of Messrs. John Byrd John Hall and John Stevenson by the hands of Messrs. Thomas and John Stevenson One Thousand pounds on Account of the Brief granted for the use of the Colleges in New York and Philadelphia in America We say recd by Virtue of the within power granted to us for that purpose

WILLIAM SMITH JOHN JAY

1000: We say one Thousand Pounds.

Witness

JAS. HATTON

JOHN BREWER.

London August 4th 1763 Received of Messrs. John Byrd John Hall and John Stevenson by the Hands of Messrs. Thomas and John Stevenson Two Thousand Pounds on Account of the Brief for the Colleges of Philadelphia and New York in America; We say, received by Virtue of the within Power of Attorney.

2000

WILLIAM SMITH for himself
& SR. JAMES JAY

Witness

EDWD. WHIELDON.

Received, London 10th February 1764 of Messrs. Byrd, Hall Stevenson, by the Hands of Thomas John Stevenson the Sum of Four Thousand Pounds, which with the Sum of two Thousand Pounds paid at the Bank the 9th October 1763, makes together the Sum of Six Thousand Pounds on further Account of the Brief for the Colleges of Philadelphia and New York in America. We say received by Virtue of the within Power of Attorney.

6000

WILLIAM SMITH for himself
& SIR JAMES JAY

BARLOW TRECOTHICK

WM. NEATE

Received, London April 4th 1764; of Messrs. Byrd, Hall and Stevenson, by the Hands of Messrs. Thomas John Stevenson the Sum of Six Hundred Pounds, on further Account of the Brief for the Colleges of Philadelphia and New York, making with former Payments above mentioned the Sum of Nine Thousand Six Hundred Pounds in the whole now paid on Account of this Brief. We say received by Virtue of the within Power of Attorney.

WILLIAM SMITH
for himself and
SIR JAMES JAY

600

BARLOW TRECOTHICK
WM. NEATE

On the back of No. 2 appear the following Receipts :

3d May 1765 Recd of Messrs. Byrd Hall Stevenson by the Hands of Messrs. Thomas John Stevenson the Sum of Five Hundred Pounds on Account of the Brief for the Colleges of Philadelphia New York in America. We say Received by Virtue of the within written Power of Attorney.

500

THO. PENN
BARLOW TRECOTHICK

Witness

JAS. HATTON

London 15th July 1767 Stated and Settled the Account of the within mentioned Brief for the Colleges of New York and Philadelphia with Messrs. Thomas and John Stevenson on Behalf of Messrs. John Byrd John Hall and John Stevenson and allowed the same and then Recd of the said Thomas and John Stevenson the Sum of Three hundred and Eighty-eight Pounds five Shillings and one Penny half Penny being the full balance of said Account on behalf and for the use of the said Colleges.

THO. PENN
BARLOW TRECOTHICK

Witness

JOHN WARREN.

[Indorsement in lower left hand corner]

College N. York & Philadelphia

Settled 15 July 1767.

J. HARTLEY MERRICK,
Asst. Secy. Univ. Penn.

**RECENT WORK AT THE WILLIAM PEPPER LABORATORY
OF CLINICAL MEDICINE.**

There is about to be issued from the Pepper Laboratory a volume of "Transactions," containing the work of the Associates during the past year. The volume will be handsomely illustrated, and will contain about 400 pages of matter. The following brief descriptions of some of the contents may be of interest:

Dr. Alonzo E. Taylor contributes a comprehensive paper on "Leukemia," reporting a series of nearly twenty cases in which accurate studies of the blood were made from time to time, and in several of which, searching examinations of the chemical processes of the body were instituted. In a few of the cases post-mortem examinations were made. The contribution reviews the literature of the subject most thoroughly, and in particular takes up the question of the nature and origin of the disease under discussion. The chemical investigations referred to in the paper are of particular interest at the present time, as bearing upon the large problems of formation and excretion of xanthin bases and uric acid: the studies of the blood deal with the interesting question of the origin and fate of the white corpuscles.

Dr. William G. Spiller contributes a paper on "Muscular Dystrophy," reporting one case of infantile type that is of historic interest. This case was first reported in the literature by Duchenne, of Boulogne, many years ago, before the nature of the disease was at all recognized. In 1886, the case was studied in the hospitals of Paris, and reported by Landouzy and Dejerine, and finally the patient died at Bicêtre some years later. Dejerine made accurate dissections, muscle by muscle, and preserved portions of each. The material was placed at Dr. Spiller's disposal, and its study occupies a large part of the present paper. One of the interesting features of this report is the fact that absolutely normal nerves are found in the midst of the muscles which had become totally degenerated. The report also includes a case of muscular dystrophy of juvenile type.

A second paper by Dr. Spiller is a clinical and microscopic study of a case of "Amyotrophic Lateral Sclerosis." The

interest in this case centres upon the degeneration of the nervous system, which has been traced very extensively in Dr. Spiller's case.

A third paper by the same writer embodies a report of a hitherto unrecognized tract of fibres in the central nervous system. This tract was followed by its downward degeneration from the thalamic region of the brain to the cervical region of the cord.

Dr. David L. Edsall contributes a report of an instance of chronic stomach trouble that was studied in the University Hospital during a considerable length of time. There was at first a benign disease of the pyloric end of the stomach, and subsequently a transformation into cancer. The report is of interest in showing the stages in the clinical symptoms corresponding with the transformation of the disorder from a simple to a malignant disease.

A second paper by the same writer, upon the metabolism with increased and decreased administration of water, is under preparation and may be included in the published report.

Dr. S. S. Kneass describes the bacteriological findings in some twenty cases of measles. The bacteria were found in the eyes, throats and other superficial parts of the patients, and, in some of the cases, in the blood as well. The organism usually detected in these cases was that commonly known as the *Bacillus xerosis*.

Dr. Joseph Walsh records a study of fourteen cases of whooping-cough in which the bacillus of Czaplewski and Hensel was isolated in seven. The paper also describes experimental studies of the pathogenicity of this organism which leads to rather negative conclusions, and also details an investigation of the possibility of immunization and cure of the disease with blood serum from immune individuals.

Dr. Charles H. Frazier contributes an experimental study of the "Causation of Appendicitis." The main purpose of this study was to determine to what extent obstruction at the mouth of the appendix is the cause of this disease. It is known that appendicitis is frequently accompanied by inflammation of adjacent parts, but the exact order in which the various changes occur is not as yet certainly determined, and Doctor

Frazier's study was intended to help in the solution. He conducted his experiments upon rabbits, because in these animals the arrangement of the appendix is sufficiently similar to that in man to furnish satisfactory analogies. It was shown in these experiments that ligature of the entire appendix, absolute stoppage of its circulation, introduction of various foreign bodies, and other procedures of the kind, are capable of producing appendicitis. But the most important condition apparently was the obstruction of the mouth of the appendix. It was found that the micro-organisms within the appendix increased greatly in their virulence when this part of the intestinal tube was completely shut off from the adjacent cecum. The conclusion from this would seem to be obvious: obstructions of the mouth of the appendix first lead to a multiplication of the bacteria by their retention, and then to increased virulence of these organisms.

Dr. Joseph Sailer presents an article on "Endothelioma of the Pulmonary Vein." This form of tumor, while not altogether unrecognized in the walls of the blood vessels, is one of great rarity in the form in which it occurred in this case, and the report of Doctor Sailer is, therefore, one of much importance. Dr. Sailer also adds a report of a case of Endothelioma of the cord.

Dr. Alfred Stengel contributes a paper on the "Anatomy and Pathology of the Red Blood Corpuscles," based upon some experimental studies. The principal fact in this paper is the attempt to show by introduction of blood of various animals into other animals that the degenerative changes sustained by the red blood corpuscles are similar to those which occur in the corpuscles in various forms of anemia. Previous investigators have studied the degenerative changes of the corpuscles outside of the body. Under these circumstances artefacts might too readily be produced; hence the investigation under discussion.

Dr. Alfred Stengel, with Dr. C. Y. White, also contributes a study of the blood in fifty or more cases of diseases of children. The object of this paper was to discuss the variations in the blood of children, suffering from certain diseases, compared with the blood of adults having the same diseases.

Dr. A. E. Taylor and Dr. Joseph Sailer describes a case of fatal sulphonal poisoning, of which the blood and nervous system prevented important and hitherto undescribed alterations.

Dr. A. E. Taylor and Dr. C. H. Frazier present an experimental paper upon Intravenous Injections of isotomic salt solutions, and describe the chemical conditions of the blood and the lymphogosis observed in connection therewith.

ADVANCES IN METHODS OF TEACHING ZOOLOGY.

By Edwin G. Conklin, Ph. D.

Professor of Zoology, University of Pennsylvania.

[Read before the meeting of the American Society of Naturalists, held under the auspices of Columbia University, New York City, December 28-30, 1898.]

By *advances in teaching* I understand the use of desirable methods not now generally employed, for while the common methods of this generation are advances over those of a preceding one, a discussion of this fact could have no possible value, and only an historical interest to us.

I take it that the common method of teaching zoology is by means of laboratory work supplemented by lectures or recitations; and further, that both teacher and institution are well equipped for this work: these are prerequisites, the need of which need not be emphasized here. Beyond and in addition to these common provisions, what advances in teaching zoology are both possible and desirable? Many minor features might be considered, such as certain improvements in laboratory and museum methods, the best sequence of subjects, the relations of lectures to laboratory work, etc.; but I prefer to emphasize two, and only two, main features, viz.: (1) the relations of research to teaching, and (2) the study of the whole of zoology.

(1) One of the greatest possible advances in teaching zoology would be the promotion of research work in all institutions of college or university grade, and the establishment of the closest possible relations between teaching and research. Advances in teaching must be, in the main, founded upon advances in research. Objects which every beginner in zoology sees and studies to-day were known to only a few investigators ten years ago. Methods which are common property now were then

being worked out for the first time. The interest and value of teaching is directly proportional to the teacher's acquaintance with original sources of knowledge. The all too common method of leaning—or rather riding—upon a text-book violates the whole laboratory idea; while the more advanced custom of relying upon original papers, without making any attempt to see the things described, is but little better. Every teacher should endeavor to see and know for himself, and to give his students the opportunity to see and know, the classical objects upon which important doctrines of zoology rest.

But the relation of the teacher to research should not be merely that of a *hearer* of the word, but of a *doer* also. Research work on the part of the teacher and, if possible, by at least a few advanced students, should be a part of the *teaching equipment* of every college and university. Too frequently and indiscriminately has it been maintained that the qualities which make a man a good investigator ruin him as a teacher. The examples of Agassiz, Huxley, Leuckart and many others, both here and abroad, show how erroneous is such a view. Great ability as an investigator may be united with qualities which are ruinous to the teacher, but these are not qualities essential to research. On the other hand, a good teacher must be, at least to a certain extent, an investigator also. The ability to make a subject plain is not the first nor, indeed, the most important function of a college or university teacher: his first duty is to arouse interest in his subject, to direct students to reliable sources of information and to encourage them in independent work. For all of these purposes research is of the utmost value. A new fact discovered in a laboratory is a stimulus to faithful and independent work, such as nothing else in the world can be; whatever other requirements colleges and universities may make upon their teachers, they might safely require that they be contributors to knowledge. The greatest mistake which a college or university teacher can make is to talk and act as if his science were a closed and finished one. A subject which seems old and stale to the teacher will seem uninteresting and unimportant to the learner. To the teacher who has only a text-book knowledge of things all subjects soon seem finished, fixed, bottled and labeled; once a year, perhaps,

he wearily exhibits these dead and changeless things before his suffering class. But the teacher who realizes how little we know about any subject and how much remains to be learned—who, while accurately presenting what is known, can by both precept and example help to extend the bounds of knowledge—will never find his subject stale nor his class uninterested.

It will be objected that in many subjects and in most institutions such a course is impossible. Undoubtedly it is more difficult to make discoveries in some fields than in others, but it is one of the particular charms of the biological sciences that the opportunities for research here are greater than in most other subjects. The great amount of teaching and of administrative work which is required of many teachers is the greatest obstacle to this plan: and yet I know persons who teach from twenty-five to thirty hours a week, and who yet find time to do research work, if in no other way, at least by keeping their eyes open for new points in the material used in their classes.

It is sometimes maintained that there is a fundamental difference in kind between graduate and undergraduate teaching, and that the former alone can have any relations to independent work or research, while the latter must consist of information courses merely. But whatever may be true of other subjects, it is certain that biological studies encourage and develop independence in observations and reflections from the beginning. I maintain, even at the risk of being charged with holding low ideals of graduate work, that the distinction between graduate and undergraduate work in biology is one of degree and not of kind. Of course, elementary students cannot do research work of any great value; and yet they may catch the spirit of research and assist in carrying out work of importance. Some valuable work of the last few years has grown out of the careful and independent study, in undergraduate classes, of the structure, development and variations of well-known animals. The knowledge that new facts may be discovered even in elementary work is an inspiration to both student and teacher. I pity the man who has to teach a finished science: I wonder how either he or his students stand it. The zoologist has here an advantage which he cannot afford to throw away. If it is further objected that this method would induce students to neglect

well-known facts in ridiculous attempts to find new ones, or that it would assist an ignorant or lazy teacher to fill up gaps in his information by ingenious speculations, I can only reply that such an abuse should be credited to the teacher and not to the system. The thesis which I defend is simply and comprehensively this: the spirit of zoological teaching should be the inquiring, independent, alert spirit of research.

(2) Another advance not less important than the one just emphasized would be found in increased facilities for studying the whole of zoology. The time was when zoology meant merely classification; at present it means little more than morphology. A great advance will have been made when we all realize, and succeed in getting our institutions to realize, that these subjects, however important, are but a part of zoology and that a large and important field is still almost unoccupied. The usual laboratory work in zoology, viz.: the anatomy of a few alcoholic specimens, is less than one-half of the science, and in all respects the least interesting and important half. Research to-day is tending more and more to the study of *living* things, and in this respect, as in so many others, research points out the way for advances in teaching. The study of living animals; of their actual development under normal and experimentally altered conditions; of their food and the manner of getting it; their enemies and friends, parasites and mess-mates; their mating, breeding and care of young; the effects of isolation, crossing and close breeding on structure and habits; the effects of varying light, color, temperature, density of medium, etc., on color, size and structure of every part; the daily and nightly activities of animals; the origin and nature of peculiar habits and instincts—in short, the study of all the varied ways in which animals live and adapt themselves to their environment is an integral part of zoology: and who can doubt that together these things form its most important part? Yet there are few if any places where any systematic attempt is made to give instruction in these subjects.

Practically the only attempt which is made in most institutions to meet these needs is by means of field work. The value of such work cannot be overestimated, and it must always remain as an indispensable part of any broad zoological train-

ing; but it is not in itself sufficient. In large cities, and during the colder part of the year, it is especially difficult to carry on field work; and in no case is it possible to have animals under observation for considerable periods of time or to carry on experiments with them in the field. Field work must consist largely of collection, classification and scattered observations: more serious work must be transferred to the laboratory.

A most useful and important adjunct to zoological teaching is an animal house, or vivarium, in which may be found fresh and salt water aquaria; terraria for small land forms; hives for bees, ants and other insects; rooms for various amphibia, reptiles, birds and small mammals; hatcheries for the eggs of various vertebrates and invertebrates; and various appliances for the experimental study of living animals. Such a vivarium might contain a synoptic collection of living animals, worth vastly more for teaching purposes than the ordinary museum or laboratory. Botanists have long recognized the necessity of greenhouses for teaching purposes, and the need of having living material for study is quite as great in zoology as in botany. Some such vivarium is a necessity if zoology is to be studied in any broad way. It is usual in building laboratories to provide an animal room in some small, dark corner of the cellar, while the whole of the building proper is devoted to lecture rooms, laboratories and museums. It is sad to think that such a disposition of space represents the popular view of the importance of the study of living animals. In a very important sense a vivarium is the most essential part of any laboratory of zoology, representing that for which all the rest exists. In cases where it is not possible to have a separate building, or large, well-lighted rooms for this purpose, a greenhouse and animal house could be combined; and in all cases a few well-stocked ponds in the immediate vicinity of the laboratory can usually be provided without trouble or expense, which will furnish a never-failing supply of living material.

But under the most favorable circumstances the number of living animals which can be kept in or near the laboratory is not large: for making extensive studies on large numbers of animals, recourse must be had to experimental farms and to marine and fresh water stations. Little has yet been done in

the way of establishing experimental farms for purposes of pure science, though I believe they are destined to play a very important part in the development of our science in the future; but the establishment of biological stations has done more to advance the study of zoology than any other one thing in this generation. While the laboratory, the vivarium, and perhaps also the experimental farm, are things which each university must provide for itself, the marine and fresh water stations can reach their greatest usefulness through the co-operation of many institutions. Without in any way disparaging the work done by other stations of a similar kind, I think it may truthfully and modestly be said that the Woods Holl Station, in the measure of co-operation which it represents; in the close relations which there exist between teaching and research; and in the fullness with which the whole of zoology is represented, has done more to advance the teaching of zoology in this country than has any other institution or factor. The professor of anatomy in one of our best medical schools said to me a few days ago: "In all my teaching I try to follow the general methods employed in the classes at the Woods Holl Laboratory: those methods are models of good teaching." If this can be said for the teaching of human anatomy, how much more is it true of the studies which are there directly represented. Some of the greatest possible advances in teaching zoology will be found in realizing in every college and university the Woods Holl ideal.

PROCEEDINGS OF THE CORPORATION.

At a postponed meeting, held on January 10, 1899, the following business was transacted :

The Provost, Mr. Merrick and the Secretary were authorized to prepare a suitable minute with reference to the death of Ezra Otis Kendall, LL. D., Honorary Vice-Provost, Honorary Dean of the College Faculty, and Thomas A. Scott Professor of Mathematics. The Provost made the following announcements: the selection of the Hon. Seth Low, LL. D., President of Columbia University, as

University Day (February 22) Orator ; the award of new Law School building contracts to Charles McCaul ; the adverse decision of Supreme Court *in re* Ruth bequest of \$5,000 ; the issue of the University Catalogue for 1898-99. Elections to Trustee representation on several boards were held as follows :

Managers of the University Hospital : (election deferred).

Managers of the Veterinary Hospital: Messrs. Sims, Mitchell.

Managers of the Wistar Institute: The Provost, Messrs. Sellers, Mitchell, Dickson, Lewis, Harris.

Managers of the Department of Archæology and Paleontology: The Provost, Messrs. Harris, Frazier, Smith, Pennypacker, Morgan, (elected by Trustees) Eckley B. Coxe, Jr.

The Provost announced standing committees for the current year as follows:

On Finance and Property: Messrs. Morgan (chairman), Dickson, Sims, Gest, Frazier, Houston. (Elected by Trustees).

On Library and Museums: Messrs. Frazier (chairman), Furness, Sims, Harris, Rosengarten, Boardman.

On College and Department of Philosophy: Messrs. Merrick (chairman), Sellers, Harris, Rosengarten, Smith, Wood, McCrea, Houston.

On Medical and Allied Schools: Messrs. Mitchell (chairman), Sellers, Merrick, Wood, Lewis, Morgan.

On Law and Legal Relations: Messrs. Dickson (chairman), Pennypacker, Gest, Smith, Rosengarten.

On Physical Education: Messrs. Sims (chairman), Mitchell, Frazier, Houston.

On Religious Services: Bishop Whitaker (chairman), Messrs. Boardman, Harris, Frazier.

On Audit: Messrs. Gest, Sims.

On University: The Provost (chairman), Messrs. Morgan, Frazier, Merrick, Mitchell, Dickson, Sims, Bishop Whitaker.

NOTES.

The Library.

The Library has recently acquired an exceedingly interesting document which takes us back almost to the foundation of the Philadelphia Academy. It is a small duodecimo pamphlet of twenty pages, printed by Benjamin Franklin and D. Hall in 1753, and comprises "The Prayers for the use of the Philadelphia Academy." It begins with a morning and evening prayer "to be used by every scholar in his chamber" upon "rising from bed" and upon "going to bed." Then follows the "Publick Prayer" for the morning, beginning with some quotations from Psalms and Proverbs. An "Exhortation" follows, addressed to the "Dear Children;" "Do not, my Children," it concludes, "attend to the Words only, but ponder them in your Minds and let your Heart go along with them; you can not do a more disobliging Thing than to be careless or indifferent whilst you are at Prayer; don't, I beseech you, give Room for any Blame of this Sort." Two prayers, one for "Divine Protection" and one for "Wisdom," conclude the morning service.

The evening service again begins with some sentences, followed by an "Exhortation," in which, among other things, the scholars are told "never to tell a Lye, either in or out of School. If you have been so unhappy as to have done Wrong, own it, be ashamed for it, and amend it. Never offer to put your Faults on others or palliate them or excuse yourselves, where Circumstances will not admit of it." The evening prayers are "for the Love and Practice of Truth," and a general evening prayer which invokes divine protection upon "our most gracious Sovereign and all the Royal Family, together with those who are put in Authority under him; particularly the Proprietaries, Governor, Assembly, and all the subordinate Magistrates of this Province." The prayer concludes with the Lord's Prayer, the Ten Commandments, the Creed and a Summary of our Duties to God and our Neighbor.

The pamphlet was purchased at a recent sale in this city through contributions received from friends of the University. It is the only copy known to be in existence.

Languages.

The regular stated meeting of the Language Union was held on Wednesday afternoon, January 11, in College Hall. Professor Rennert read from an "Account of the Life of Don Guillen de Castro," which he is shortly to publish as matter prefatory to a critical edition of de Castro's play, *La Ingratitud Por Amor*. Mr. Quinn followed with a paper on the Elizabethan comedy, *The Faire Maide of Bristow*, its authorship, source and relation to the drama of the time. Both papers led to discussion, in which Professor Muller, of the University of Paris, took part. The next meeting of the Union will be held on Thursday afternoon, February 2, on which occasion papers will be presented by Dr. Bates, Instructor in Greek, and by Mr. Prettyman, Assistant in German.

A valuable contribution to the study of mediæval didactic literature is the edition just published by Dr. S. P. Molenaer, Instructor in French, of Egidio Colonna's once famous educational treatise, *De Regimine Principum*. The author, a disciple of Thomas Aquinas, General of the Augustinian Order and later Archbishop of Bourges, compiled this work while tutor of the Dauphin of France, Philip the Fair, son of Philip III., before 1285. A French version of the original Latin was made soon after, as we know of an Italian MS. dated 1288, which contains a translation of the French version. The work is executed on a broader basis than similar mediæval treatises, and it is doubtless of very great importance to anyone interested in the "political ideal" of the fourteenth century. It consists of three books, treating respectively of the government of Self, that of the Family and that of the State. Book I discusses the *Summum Bonum*, the virtues, emotions and habits. Book II treats of the wife, the children and the many questions bearing upon domestic economics. Book III, after discussing the views of ancient philosophers concerning the State, treats of the best civil government in times of peace; and its concluding part is devoted to all the questions of military and naval warfare. The present volume, published by the Macmillan Company, New York City, for the Columbia University Press, is a handsome octavo, XLII and 461 pages; containing, besides the French text, an introduction, notes and appendices, and a

full-page facsimile of the first folio of the MS. from which this edition was made. It is interesting to note that this MS. is one of the few old French MSS. found in American libraries, being the property of Mr. John E. Kerr, Jr., of New York City, a business man and bibliophile of the first order.

B ology.

The annual discussion at the meeting of the American Society of Naturalists, held at Columbia University, December 28-30, was on the general topic of "Advances in Methods of Teaching." The following subjects were represented by the persons named: Anatomy, Professor George S. Huntington, Columbia University; Physiology, Professor W. T. Porter, Harvard Medical School; Psychology, Professor Hugo Münsterberg, Harvard College; Anthropology, Doctor Franz Boas, Columbia University; Botany, Professor W. F. Ganong, Smith College; Zoology, Professor E. G. Conklin, University of Pennsylvania. Professor Conklin's paper appears elsewhere in this issue.

Other papers by Professor Conklin were read as follows: On "Zoology as a Requirement for Admission to College," before the New York State Science Teachers' Association, December 29, 1898; and on "Protoplasmic Movement as Factor of Differentiation," before the American Morphological Society at its recent meeting in New York.

NEW COURSE IN ENGLISH VERSIFICATION.

The following is a syllabus of the course in the Principles and History of English Versification, to be given in the Department of Philosophy (Graduate School) by Dr. Raymond M. Alden, Senior Fellow in English on the Harrison Foundation:

I.

Nature of verse as *rhythmical sound*; relation to music and dancing.

Sound-elements: Time, Accent, Quality, Pitch.

What we mean by verse-rhythm.

Relation of Time and Accent in English verse.

Kinds and degrees of Accent.

Kinds of Feet.

Varieties of *line* or *verse*.

Anacrusis, Catalexis, Enjambement, etc.

Pauses: *Cesuras* and *Rests*.

Stanzas: what makes a stanza; various forms.

Tone-quality:

(1) As a co-ordinating element:

Alliteration.

Assonance.

Rhyme proper (its kinds and uses).

(2) As a decorative element:

Vowel color, consonant syzygy, onomatopœia, etc.

How to Scan:

Irregularities (Substitution, Contraction, Elision, etc.).

Observance of *conflicting rhythms*.

II.

Nature of poetry apart from metrical form:

The poetic way of looking at objects.

Place of emotion, imagination, etc.; "romantic" elements.

Varying definitions and theories of poetry:

Aristotle, Sidney, Puttenham, Jonson, Dryden, Addison, Pope, Johnson, Coleridge, Wordsworth, Arnold, Pater, etc.

"Poetic diction:" its source; Wordsworth's theory, etc.

Relation of form to substance in good poetry.

III.

Main distinctions between classical and Germanic verse.

Periods of the history of English verse.

Anglo-Saxon verse: characteristics and types.

Theories of Lachmann and Sievers.

Characteristic changes of Middle English period.

Foreign influences, new metres, etc.

Theories of origin and growth of *rhyme*.

Chaucer's verse.

Alliterative Long Line and "Tumbling Verse."

Fifteenth century: general characteristics.

Early dramatic verse; ballad measures.

The Renaissance; its influence on English poetry.

Characteristic verse-changes, foreign influences, etc.

Wyatt and Surrey, Tottel's *Miscellany*, Gascoigne, Webbe and Puttenham, Sidney, Spenser and the Spenserian stanza.

IV.

Decasyllabic Couplet:

Theories of origin of decasyllabic verse in English; relation to foreign and to native measures.

Chaucer, Spenser, Elizabethan satirists, Jonson.

Sandys, Waller, Denham, Davenant, Cowley, Oldham, Dryden.

The couplet in the Drama.

Addison, Pope, Johnson, Goldsmith, Cowper, Crabbe.

Characteristics of the true "heroic" couplet.

Eighteenth century verse illustrative of the literary ideals of the time.

The couplet of Keats.

Blank Verse:

(1) In imitation of classical measures:

Ascham, the "Areopagus," Harvey and Spenser, Sidney, Stanyhurst, Webbe, Campion.

Modern hexameter: William Taylor, Southey, Coleridge, Longfellow, Clough, Kingsley, (M. Arnold).

(2) Iambic Pentameter:

Relation to rhymed couplet.

Surrey, Grimald, Sackville, Gascoigne, Turberville, Lyly, Peele, Greene, *Marlowe*.

Shakespeare's blank verse.

Verse of later drama: Jonson, Beaumont, Fletcher, Middleton, Massinger, Brome, etc.

Verse of Restoration Drama: Dryden and Otway.

Relation of epic and dramatic blank verse.

Milton.

Blank verse in eighteenth century: Thomson, Glover, Young, Cowper, etc.

Blank verse of Wordsworth, Keats, Shelley, Tennyson, Browning, M. Arnold.

The Sonnet:

Origin and formal rules of construction.

Italian and English types.

Wyatt, Surrey, *Sidney*, Elizabethan sonneteers, Spenser,
Shakespeare, Milton, Bowles, Coleridge, *Wordsworth*,
Keats, *Mrs. Browning*, *Rossetti*, Tennyson.

Significance as a poetic form.

The Ode:

The Greek ode: Jonson, Congreve, Gray, etc.

The irregular ode: Cowley, Dryden, Wordsworth, Keats,
Tennyson, Lowell, etc.

The "Horatian" ode.

Significance of irregular poetic forms.

Artificial French Forms:

Early origin and history; revival in nineteenth century.

Rules of the Ballade, Chant Royal, Rondel, Rondeau,
Sestina, Triolet, Villanelle, etc.

Use in *vers de société*.

Aesthetic significance.

Ballads and Songs:

General characteristics of popular verse, and of verse for
music.

Early ballad measures and their descendants.

Artificial song-forms, Elizabethan lyrists, etc.

Significance of Burns.

ABSTRACTS OF RECENT PAPERS.

"The Faire Maide of Bristow."

ARTHUR H. QUINN.

[Read before a meeting of the Language Union, January 11, 1899.]

The editing of this play was undertaken at the suggestion of Professor Schick, of the University of Munich, on account of the publication by Johannes Bolte of its translation by Ludwig Tieck, in the *Shakespeare Jahrbuch* for 1895.

The Faire Maide of Bristow was published anonymously by Thomas Pavier in 1605, and since then it has not been reprinted. Copies of the original quarto, on which the present edition is based, are in the British Museum and the Bodleian Library. A manuscript copy of the quarto is in the Königlische Bibliothek at Berlin. This was made for Tieck in 1817 for purposes of translation.

As will be shown in the published introduction, neither the ballad of *Maudline; or the Merchant's Daughter of Bristol*, nor the dramas, *Jack Strawe* and *Look About You*, which Bolte discusses as probable sources, have anything in common with *The Faire Maide*. The real source of this play is the drama entitled *How to Choose a Good Wife from a Bad*, published in 1602, and credited by Hazlitt to Joshua Cooke and by Fleay to Heywood. The source of *How to Choose a Good Wife from a Bad* is to be found in the *Hecatommithi* of Geraldini Cinthio (Part one, decaterza, novella cinquana), but it is improbable that this novella had any influence on the *Faire Maide*, as there are no incidents common to the Italian story and this play which do not appear in the earlier comedy.

Collier, in his edition of the *Diary of Philip Henslowe*, identified the *Faire Maide* with the lost *Bristow Tragedy* of John Day. This statement, however, is easily proved a mistake.

The *Bristow Tragedy* was entered for the Admiral's men at the Fortune Theatre, while the *Faire Maide* was played at Hampton Court by the King's men, a company for which Day never wrote. In addition, internal evidence is against Day's claim, for the dramas of John Day are poetical and satirical, rich in vocabulary and classical allusion, fanciful in imagery, light and pointed in humor and often obscure and involved on account of the very wealth of these characteristics. *The Faire Maide of Bristow* is clear, direct blank verse, in which the poetical element is not conspicuous, with limited vocabulary and almost entire freedom from allusion and satire. The humor is broad and the imagery is direct. An examination of the metre also shows the plays to be different in the main qualities of construction and arrangement. So that, considering the evidence to the negative and the slight foundation on which Collier's statement is based, it is safe to decide that the *Faire Maide of Bristow* was not written by John Day.

The claims of Shakespeare, Johnson, Drayton, Wilkins, Armin, Tourneur and Barnes, who were writing for the King's company at this time, are discussed in each case with negative results.

The *Faire Maide* is to be classed among those plays which deal with the sufferings of a faithful, but ill treated, wife. In the published introduction a comparison of characters will be given between the *Faire Maide* and four other plays of this group, *How to Choose a Good Wife from a Bad*, *The Wise Woman of Hogsdon*, *The London Prodigal* and *The Miseries of Enforced Marriage*, all of which contain striking mutual resemblances. There will also be a discussion of the motive of the faithful wife in general in the literature of this age.

Guillen de Castro.

HUGO A. RENNERT.

[Read before a meeting of the Language Union, January 11, 1899.]

An attempt was made in this paper to follow more closely the career of the author of *Las Mocedades del Cid* than his biographers had done heretofore. From evidence adduced it resulted quite surely that Don Guillen passed the interval between 1603 and 1608 at Naples, for in the former year his patron, the Count of Benevente, was appointed Viceroy of Naples, and in October of the latter year the Duke of Osuna, from whom he is said to have received a pension, returned from Flanders; and it is not very likely that a pension was bestowed without a personal meeting between poet and patron. It was also shown that in all probability Castro spent the interval between 1620 and the time of his death, July 28, 1631, at Madrid. A number of other points in the career of this unfortunate poet were discussed, the close of whose life was embittered by poverty; but as the paper as read was a part of an introduction to one of Don Guillen's plays, *La Ingratitud por Amor*, which is soon to appear in the University Series in Philology, Literature and Archæology, it was considered unnecessary to analyze the paper with greater detail.

RECENT BOTANICAL PAPERS.

At the general meeting of the Affiliated Naturalists Societies held during Christmas week, at Columbia University, New York, seven representatives from the Botanical Department attended the meetings of the "Society for Plant Morphology and Physiology." Thirty-two papers were read, and the following is a short summary of five presented from the University of Pennsylvania:

Dr. J. W. Harshberger spoke on "The Structure of *Paulownia imperialis*." It is a tree of umbrageous habit, native of the central provinces of Japan. The branching of the tree is sympodial, *i. e.*, the terminal leader, or shoot, is prolonged into a flower cluster, which ends the growth. The leader of the next season is developed from a lateral bud. The inflorescence is a raceme of dichotomous passing into scorpioid cymes. The flowers are formed in the season preceding their expansion. The petals, stamens and pistils are protected by the five sepals, which are thick, fleshy, overlapping and protected by a dense covering of branching ferruginous protective hairs, securing the buds against the summer sun and the winter cold. The leaves are also provided with these hairs on the upper, but to a greater extent on the lower, surface, where they may be said to mat together, thus preventing the rapid loss of water.

The fruits are developed late in the season, and the pods are ready to open by the end of November. In mid-December the seeds are discharged. These are light-winged and are blown very considerable distances. The seeds before discharge are borne on placental cushions, which contain a large amount of tannin, and this seems to disappear as the pod becomes older. The tannin may or may not be a reserve substance. In the leaf petioles are found numerous crystals of calcium oxalate of different shapes, supposedly formed by variations in the metabolic activity, for it is a proven physical fact that by changing the conditions of crystallization various forms of crystal may be produced.

Mr. C. H. Shaw, M. A., described "The Inflorescences and Flowers of *Polygala polygama*." The plant bears pink-purple flowers on aerial shoots, and cleistogamic flowers on subterranean shoots. In late summer it has been found that green cleistogamic flowers appear on green geotropic aerial shoots. Study of the two first shows many points of difference. In the underground flowers the five sepals are all small, and there is only one petal, the stamens also are reduced from eight to five, four or even two. In the pink-purple flowers the pistil bears a curious terminal tuft of hairs, with the stigma on one side of the style column. In the subterranean flowers the style and tuft are reduced to the vanishing point, and the stigma is sessile on the ovary. Still more striking are the pollen grains which, in the subterranean flowers, have thick walls. The ovary also has a shaggy coat of glandular hairs. These variations would seem to be in the line of advancing specialization rather than of degeneration. The aerial cleistogamic flowers are very neatly intermediate in structure between the above two. In their pollen grains and in the development of their pistils the intermediate character was specially shown. The pink-purple flowers rarely set seeds, the other two do so freely.

Mr. R. E. B. McKenney, B. A., spoke on "The Development of some *Monocyledonous Embryo-sacs*."

In *Scilla* this was described in detail, while reference was made to *Lilium*. The archesporium is a hypodermal cell, and by a series of periclinal walls, divides into five cells, two being tapetal cells. Of the three remaining cells, the middle becomes the embryo-sac, while the lower becomes quadrinucleate. The presence of this quadrinucleate cell seemed to throw light on the nature of the embryo-sac. It was supposed that the quadrinucleate cell was a sporocyte which had divided into four spores. The embryo-sac was supposed to be two sporocytes with eight spores, but no separating wall was laid down between the two sporocytes. The apparent individuality of each group of nuclei in the embryo-sac, together with the presence of a separating wall in *Myosurus*, was considered as evidence favoring this view. The speaker had also been able to confirm the observations of Mottier regarding the formation of the nuclear spindle. No centrosomes were observed.

He then described "The Structure and Relation of the Crystal Cells in Sensitive Plants." The position of the crystal cells and their presence

in several species of *Mimosa*, *Oxalis* and *Acacia* were mentioned. The crystals were insoluble in ordinary reagents and seemed to be insoluble silicates. The crystal cells contained in addition to the large crystal a very small nucleus, which did not contain a nucleolus. Sap vacuoles, as well as starch grains, were also absent from these cells.

The crystals were absent from the cotyledons of sensitive plants, and made their first appearance in the cells at the distal ends of the main bundles as spicular bodies. The crystals developed in basipetal fashion along the entire length of the bundles.

The more sensitive plants showed the crystal cells better developed than the less sensitive and *vice versa*. Much evidence has been accumulated to show that stimuli are most rapidly propagated in the neighborhood of the phloem. Since the crystal cells lie so close to the phloem and vary in development with the sensitivity of the plant, it was supposed that they formed the path for most rapid propagation of stimuli.

Miss Amelia C. Smith described "The Structure and Parasitism of *Aphyllon uniflorum*." The most conspicuous features of this plant, as thus far worked out, are as follows:

I.—Its parasitism on *Aster corymbosum* and the degeneration attendant upon its parasitic habit, as expressed by:

- (a) Absence of chlorophyll.
- (b) Degeneration of leaves.
- (c) Loss of root hairs and probably of root cap.
- (d) Reduction and degeneration of the bundle system, and greater relative development of phloem than of xylem.
- (e) Small size of seed, primitive embryo and development of this embryo within a mass of (probably) precocious endosperm.

II.—Stomata, where present, are on the more exposed places, *i. e.*, outer surfaces of upper bract-leaves, upper part of flower-stalk, outer surfaces of calyx and corolla.

III.—Starch is present in great quantities in roots, stems, leaves and carpellary tissue.

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Founded 1740

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FEBRUARY, 1899.

“UNIVERSITY DAY,”

February 22, 1899.

PROGRAMME.

SELECTIONS *The Municipal Band.*

ACADEMIC PROCESSION.

PRAYER *Rt. Rev. Ozi W. Whitaker, D. D., LL. D.*

NATIONAL HYMN—“America.”

INTRODUCTION *Provost Charles C. Harrison, LL. D.*

ADDRESS . *President Seth Low, LL. D., Columbia University.*

UNIVERSITY HYMN—“Hail! Pennsylvania.”

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INVOCATION BY THE BISHOP OF PENNSYLVANIA.

Almighty God, our Heavenly Father, we come to Thee as Thy children to thank Thee for Thy great mercies. We thank Thee that Thou hast given us this land to be our home ; for civil and religious liberty, and for every comfort and convenience of our lives. May Thy blessing rest upon this our country. Build up and sustain this nation in righteousness. Give the spirit of obedience to law to all our people. Protect our homes ; establish our liberties ; and give us grace and power to secure to oppressed peoples such liberties as Thou hast given us.

Strengthen us in religion and in the knowledge of the truth. Surround us with uplifting influences, and make our land the abode of peace and prosperity. Commit the guidance of our affairs to the upright and conscientious, so that every virtue may flourish, and the kingdom of Thy Son be exalted, through the same Thy Son Jesus Christ our Lord.—Amen.

We thank Thee that when Thy purposes for this land were unfolding Thou didst raise up Thy servant, George Washington, to be the guide and leader of this people ; to be their Commander in war, and their Chief Magistrate in peace ; and that by him Thou didst conduct them through struggle and peril and strife to victory and its fruits.

Grant, O Lord, we beseech Thee, that we and all this people may be animated by his spirit, and follow his example ; that we may never use opportunities that come in our way for the advancement of personal interests at the cost of public welfare ; that our zeal for the success of a party may never be stronger than our love for our country ; and that whether our station be high or low, according to the standards of men, we may always regard

ourselves Thy servants, whose highest privilege, as well as duty, is the faithful doing of Thy will.

May Thy blessing, O God, rest upon the University of Pennsylvania, that it may be more and more a centre of sound learning and good influence; that its sons may go forth from year to year to reinforce the best citizenship of the State, and to be each one an embodiment of justice and truth and fidelity to principle; and that they may thus fulfill their course with honor and usefulness in this life, and attain the high destiny which Thou hast made possible for them in the life to come, through Jesus Christ our Lord.—Amen.

O God, the Sovereign Lord and King, Who hast given unto men the administration of government upon earth, we make our supplications unto Thee for all those who have that trust committed to their hands. Enable them, we pray Thee, to fulfill the same to Thy honor and the welfare of the nations among whom they rule. Especially we implore Thy favor upon Thy servants, the President of the United States, the Senate and House of Representatives, the governor and the Legislature of this State, and upon all who have the making or the executing of law in the land. Endue them with uprightness and wisdom, with firmness and clemency. May they remember Whose ministers they are, and the account which they must render to Thy throne. To the people of all ranks and conditions among us, give the spirit of obedience to government and of contentment under its protection, in leading peaceable and honest lives. Let the righteousness prevail which exalteth a nation, and throughout our land let the name of Thy Son be acknowledged as King of kings, and Lord of lords, to Thy honor and glory, Who art God over all, Blessed for evermore.—Amen.

Direct us now O Lord in all our doings with Thy mighty power, and further us with Thy continual help;

that in all our works begun, continued and ended in Thee, we may glorify Thy holy Name, and finally by Thy mercy obtain everlasting life, through Jesus Christ, our Lord.—Amen.

The grace of our Lord Jesus Christ, and the love of God, and the fellowship of the Holy Ghost, be with us all evermore.—Amen.

THE BENEDICTION.

The God of peace, Who brought again from the dead our Lord Jesus Christ, the great Shepherd of the sheep, through the blood of the everlasting covenant; make you perfect in every good work to do His will, working in you that which is well pleasing in His sight; through Jesus Christ, to whom be glory for ever and ever.—Amen.

INTRODUCTION BY THE PROVOST OF THE UNIVERSITY.

I suppose that no two Universities ever existed with histories more parallel than those of the University of Pennsylvania and Columbia University. In this presence, it might seem more courteous to name them in reverse order, and so I would, if there were a recognized and appreciable difference in the order of seniority. But that difference is so minute—they were founded so nearly together—that, as in the case of twin sisters, the habit of naming them in the right order must be cultivated. Our first charter is dated 1753; that of Columbia, 1754. Situated in the largest towns of adjoining Provinces, they were in no sense descendants of the New England system, but spontaneous responses to the growing needs of their several communities; and the mode of their development was as nearly alike as the peculiar constituencies of the two Provinces made possible. Very early in their career, the two corporations came into undesigned contact, curiously

enough in the city of London, and the open question as to whether that contact should be hostile or fraternal was happily settled, on the terms of cordial friendliness—a friendliness that has never since been disturbed by any shadow of rivalry or contention.

It came about in this way. The College of Philadelphia and King's College (New York) found themselves in like circumstances, and these—strange as it may sound in this day of Colleges and Universities—a dire want of money! In 1761, our first Provost, Dr. William Smith, was commissioned to go to England in order to solicit funds for the maintenance of the College, and he no sooner reached London than he found there Dr. James Jay, who had been sent by King's College on a similar errand. They both sought the advice and assistance of the Archbishop of Canterbury, and that wise and pious prelate not only induced them to join hands in a common effort to raise funds to be equally divided between their respective Colleges; but by his personal efforts and strong influence, at a propitious time, secured for them an audience with King George III., and the issuance of a royal brief for their collections in the churches of the entire kingdom. Dr. Smith and Dr. Jay diligently followed up this brief, dividing the land between them, and met with singular good fortune. £10,488 5s. 1½*d.* were received, as shown by the vouchers in our archives, and at the same time a very strong interest in behalf of the two Colleges was established in England, productive of many after benefits. I hold in my hand one of the original letters addressed to the clergy and church-wardens of each English parish, under the date of September 9, 1762, and signed by William Smith and James Jay, and I am happy in thinking that this frail and time-worn sheet marks the beginning of that fraternal association between the two great universities which has to-day such welcome renewal in the presence of our distinguished orator.

Nowhere in the history do I find any trace of dissension or rivalry between the institutions. With perfect calmness and equanimity the records of King's College tell of the five members of its second class who were not graduated : "One in his third year went to Philadelphia " (that means to us); "another about the second year, went into the army ; a third, after three years, went to merchandise ; the fourth, after two years, went to privateering ; and the fifth, after three years, went to nothing." Nor did we grudge that young man from our own number who was one of the first recipients of a King's College degree.

The parallels run on with curious exactness. If the first president of King's had to govern the college from his distant Westchester county home on account of a smallpox epidemic in 1757, so our first provost, a little later, had to teach his classes and administer the college from a prison cell, on account of a still more virulent political epidemic. For long years both were mere colleges, with small estates, meagre buildings, and little more than local influence. In equal measure they leavened their communities with the higher learning, and fitted strong men for professional and political life. To each in time came the great awakening that has made them universities in name and in fact. Each has now its broad domain, and is building the structures that shall worthily house its energies and treasures. We congratulate Columbia on the splendid realization, on an undreamed-of site and scale, of old Dr. Burnaby's prophecy in 1760 : "The college, well finished, will be exceedingly handsome. It is to be built on three sides of a quadrangle, fronting Hudson's or North River, and will be the most beautifully situated of any college, I believe, in the world."

In the new labors and the new responsibilities of this late era, the two have been mindful and thoughtful of each other. The University of Pennsylvania was the first to give the hood to the president of Columbia, on his accession to office. Columbia graciously responded on the first

opportunity that offered; and on this, our "University Day," when we think of that great life whose noble influence is an inheritance common to us all, it is with a feeling of peculiar pride in the historical fellowship of the sister universities, and with especial personal pleasure that I introduce as orator of the day, the Honorable Seth Low, Doctor of Laws (Pennsylvania) and President of Columbia University.

"THE UNITED STATES IN 1899."

Address by the Hon. Seth Low, LL. D., President of Columbia University.

MR. PROVOST, OFFICERS AND STUDENTS OF THE UNIVERSITY OF PENNSYLVANIA, LADIES AND GENTLEMEN:

A century and a half ago, the College of Philadelphia and King's College in the Province of New York were both under discussion, but neither had yet been founded. The College of Philadelphia, now the University of Pennsylvania, was chartered in 1753, and King's College, now Columbia University in the city of New York, in 1754. It is an interesting circumstance that the same man, the Rev. Samuel Johnson, S. T. D., of Connecticut, was invited by each of the young colleges to become its first president. It would seem, therefore, as if the timber out of which college presidents are made was as scarce then as it appears to be to-day! Why it was that Dr. Johnson, in the presence of such a tempting alternative, should have chosen to become the first president of King's College, I shall not attempt to say. The incident serves to show how closely the University of Pennsylvania, and the University over which I have the honor to preside, were related in those early days. Within a decade of their foundation, both of them were represented in a joint attempt to secure funds in England for their common benefit. The original papers

relating to this transaction are in your possession. Our own records merely show that you are credited with a full and true accounting for our share of the funds so raised, about £6,000. As we were thus closely associated in origin, so the history and development of the two universities has followed parallel lines. Each being located in an important city, each illustrates the effect of a large city upon such an institution. So long as the city was small, these colleges rendered a service to the country at large second to no others. Their influence was as wide as the colonies. As the city closed about them, on the other hand, their patronage and their influence became chiefly local; because, as I suppose, their immediate surroundings were more important, and there was less need and less opportunity to reach the country outside. Few people from without were willing then, as comparatively few are now, to send their sons to college in a city at the youthful age which ordinarily marks the beginning of college life. As the educational system of the country has developed, on the other hand, in the closing decades of the present century, demanding opportunities for advanced instruction not only in the professions but in all branches of learning, it has become evident that, for this class of work, the location in a great city is in itself a distinct advantage. Accordingly, during the last two decades, both the University of Pennsylvania and Columbia University have attained once more to a position of national influence such as they have not held for nearly a century. It seems probable that the tide which has thus begun to turn will flow with increasing volume for many years to come; and it is not improbable that, even upon the college side of their work, these institutions, under the changed conditions of the country, may render a service in the future much more important than they have rendered in the past at any time since the early years of their foundation. This result is to be obtained, undoubtedly, by identifying the universities

with the best activities of the city in which each is placed—not by attempting to hold the university aloof from the city's life. For the life apart, the country or the small city is still the better location.

As our two universities have thus been closely associated in experience throughout their history, so there is an evident link between the cities of New York and Philadelphia in the history of the nation. The Government of the United States was established by the inauguration of Washington as President, in the city of New York, in 1789. In the following year the government was removed to Philadelphia, and was maintained here until it was moved again, in the year 1800, to the city of Washington, which was founded to be its abiding place. The city of Washington, in the District of Columbia, was founded in a district ceded to the Federal Government by the States of Maryland and Virginia, in order that the capital of the country might be in territory directly under federal control. It is interesting to observe that the Federation of Australia, now in process of formation, has just adopted a similar arrangement for the solution of the same problem. The capital of the Australian Federation is to be established in New South Wales, upon territory to be ceded to the federation and to be under its direct control. Thus the wisdom of our fathers, in this particular, is curiously justified and illustrated a century after the fact.

I recall that a year ago, in this place and on this occasion, we were listening to the earnest and patriotic words of President McKinley. It was only one week after the unhappy destruction of the "Maine" in the harbor of Havana. What a page of our national history has been written since! The action of the President in attending this celebration a year ago was characteristic of his attitude, as it seems to me, during the whole of that fateful spring. Nothing that he could then have done would have contributed more importantly to quieting the public

mind, at that juncture, than his appearance here at such a moment to speak the calm and measured words which we had the pleasure of hearing. Only one who has tried to meet calmly such an occasion, with a great burden of anxiety resting upon his heart, can have the faintest conception of the mastery of self called for by such an undertaking. I like to think that at every crisis in our national history, so many of which have marked the intervening months, the nation has had the benefit of the same self-control, the same cool judgment and the same utter devotion to the welfare of the country. It is not necessary to claim for the President entire freedom from mistakes in order to recognize in his general bearing a very high quality of leadership.

The anxieties of the war are over, and the problems of peace resulting from the war are now upon us. No one who has lived through it can forget the exhilarating sense of gratified patriotism which marked the action of Congress and of people as the war came on. The enthusiastic response of the volunteers to the President's calls, the splendid valor displayed by our men on land and sea, the noble devotion of good women to the sick and wounded; all of these were as welcome as our victories, except as our victories were themselves the fitting and natural reward of the qualities thus displayed. For these things show that the character of the nation, when thus tried in the fiery furnace of war, glowed with the brightness of pure and precious metal, and that the nation's capacity for self-sacrifice, in a large sense, is not less than it used to be. But this is not all. The mechanical skill and ready efficiency so characteristic of the American told with overwhelming effect in the overthrow of the enemy. This capacity to turn industrial effectiveness into efficiency in war, as the swift ocean steamers of the merchant marine take on themselves, upon demand, the qualities of men-of-war, is evidence that warlike power sufficient for our need

is developed in peace and by peace among a people that does not suffer itself to be dismayed by difficulties or weakened by luxury.

I wish it could be also said that the American genius for organization and for business had displayed itself during the war to equal advantage. In the navy it did. There was something as admirable as its fighting in the way in which everything that it fell to the lot of the navy to do, was done, quietly, without confusion and with absolute success. In the army it did not. It must in all candor be admitted that the task of the War Department was much the heavier. It had to multiply the army tenfold, and it had to do quickly on a large scale what it had only been in the habit of doing slowly and on a small scale. But it is precisely under such circumstances that genius shows; and we are obliged to admit that on the side of the War Department, the genius that has made our railroads the most effective in the world, the genius that is enabling our manufacturers to conquer the markets of the world, was not forthcoming. The Santiago campaign of the army was splendidly and brilliantly successful; and if the war had lasted longer I dare say we should have had a better criterion than we have now by which to judge how much of the dreadful suffering in camp and in the field is inseparable from war at the very best. But the contrast between the work of the Navy Department and of the War Department is too great to be wholly explained away. It is as clear as the noonday sun that the organization of the War Department and of the army is absolutely unfriendly to efficiency. The President's Commission of Investigation has pointed out some of the difficulties, and has suggested some of the remedies. It remains for public opinion to see that these remedies, or others equally effective, are promptly enacted into law. I am glad that the President has appointed a court of inquiry to go to the bottom of the grievous charges that have been made against the Commissary

Department, for it is hideously in contrast with the self-sacrificing heroism of our troops that such charges can even be mooted, much less made, by the commanding general of the army. Now that the inquiry has been ordered, the people may well await the finding with patience and with an open mind, as a people at once too great to do injustice even to a single one not known to be at fault, and too earnest to permit any who may be proven guilty either of wrongdoing or of false charges to escape the blazing fury of their wrath.

To some of our people, perhaps to many of them, the consequences to ourselves of this war with Spain seem more terrible than the dangers of the war itself. When patriots like Senator Hoar of Massachusetts and Senator Hale of Maine, not to speak of others, feel called upon to break away from their party and vote against the ratification of the treaty of peace, he must be a light-hearted man, indeed, who does not consider seriously the gravity of the decisions that have been made by those charged with authority by the American people to make precisely such decisions. I want to point out, if I can, why it seems to me that the decisions reached may be accepted with a good heart, and to indicate some, at least, of the duties that flow from the ratification of the treaty.

A century ago, John Adams was President. Washington was still alive, enjoying at Mount Vernon his well-earned retirement; and he had just given a new evidence of his unquenchable public spirit by accepting a commission as lieutenant-general of the army of the United States in view of a possible war with France, which was then feared. During the sessions of Congress held in your city the foundations were laid of the navy of the United States whose achievements and traditions have made its victories of last summer appear to be only the natural continuation of its glorious past. Truxtun and Hull, Perry and Decatur, Farragut and Porter, seem to be only other ways of spelling the names of Dewey and of Sampson.

During his presidency of eight years, Washington had demonstrated the strength of the new government in various directions. He had avoided complications with revolutionary France, despite the strong and natural popular sympathy with the country which had aided so importantly in winning our own independence; he had settled outstanding questions full of embarrassing possibilities, by a treaty with Great Britain which, at the time, was exceedingly unpopular; he had put down by force an armed insurrection; and he had inflicted summary punishment upon the Indians, who showed a disposition to harass our Western borders.

The new government, therefore, by 1799, was fairly launched; but already new dangers began to make their appearance. The election of Thomas McKean as governor of Pennsylvania in 1799 foreshadowed the triumph of Jefferson and the Republican or Democratic party of that day. In the eyes of the Federalists, who had controlled the government from the start, this seemed like the beginning of the end. There is more than a little evidence that in the minds of some of them it seemed to forebode a civil war. All the time, the problem of slavery was embedded in the Constitution, unrecognized, indeed, in a certain sense until 1820, but always there. In 1820 came the discussion which terminated for the moment in the Missouri Compromise. Like a thunderbolt out of a clear sky, these discussions revealed the electricity in the air and suggested the coming storm. Then came nullification, and all the uneasy years attending the angry controversy about slavery; and, finally, attempted secession and the Civil War. Foreign wars with England in 1812, with Mexico in 1846, and with Spain in 1898, have tested the country in its capacity for combat against an outside foe; while widespread commercial panic and disaster in 1819, in 1837, 1857, 1873 and 1893, have tested the capacity of the people for self-control under circumstances of great domestic hardship and distress.

It may fairly be said that no period of twenty years has passed that has not brought the country face to face with some grave danger and up to some new test. Phillips Brooks once said that if a man believed that the country had escaped all the dangers which have confronted it only by a series of happy accidents, such a man would naturally be full of fear at every new peril that makes its appearance, because such a man never could tell when the country's luck might not change. If, on the other hand, said Dr. Brooks, a man believes that the country has overcome the dangers of the past because its political system is inherently sound, such a man faces every new peril with a courage born of the very dangers that have been overcome.

It is in this spirit of well-grounded courage, I think, that the people of the United States should contemplate the situation in which they find themselves placed, in 1899, by the treaty of peace with Spain. The advocates of ratification have been called imperialists and expansionists, and the treaty itself has been said to be in woeful contradiction with all we stand for as a nation. These are serious charges, and it behooves every man who loves his country to consider whether they are well made. Unless our treaty with Spain has been dictated by lust of empire, it is not fair to call those who advocated it imperialists; unless it has been dictated by lust of territory, it is not fair to call them expansionists: unless a better way can be shown by which peace could have been secured, it is not just to criticise the government for accepting even unwelcome obligations that the war has brought in its train.

What then are the facts? The Congress of the United States, in demanding the withdrawal of Spain from Cuba, declared it to be the purpose of this country to secure freedom for the Cubans. There is certainly neither imperialism nor expansion in those resolutions. Up to this hour, there is not an indication that the purpose of the country,

as thus formulated by Congress, will not be lived up to both in the letter and in the spirit. It is evident, therefore, that our imperialism and our expansionism, if they exist at all, are by-products: they do not represent the heart's desire. But some one will say, "Why, then, did we demand the cession of Porto Rico and of the Philippines? If the American people are not imperialists and are not expansionists, why should we demand from Spain the cession of these islands?" The answer, it seems to me, is very simple, though it is not the same in both cases. If Spain had withdrawn from Cuba without war, she would undoubtedly be still in possession, so far as we are concerned, of both Porto Rico and the Philippines. The moment she compelled us to go to war in order to expel her from Cuba, it became evidently the dictate of good sense to make it impossible for future troubles to arise between us from similar causes by removing her from this hemisphere. She has been a difficult neighbor from the beginning. No one, I think, seriously criticises this decision.

It is said, however, that in the Philippines, by reason of their distance and their population, the case is different. Undoubtedly it is, and therefore the answer is different. Evidently it would have been unwise to attempt any solution of the Philippine problem which should place Spanish and American civilization side by side in control of different parts of the Philippine group. That would have been deliberately to reproduce in the Eastern hemisphere the very conditions that had just led to the conflict in the Antilles. It was inevitable, therefore, that either Spain or America must leave the Philippines. We had destroyed Spain's authority there, and had also destroyed her power to re-establish it. In no fair sense of the words, under these conditions, is it just to say that in determining to make peace by securing the cession of the Philippines the United States has been animated by either the lust of empire or the lust of territory.

But some say that the islands should have been surrendered to the natives under a joint protectorate. It is urged that our action, in demanding a cession of the Philippine Islands to ourselves, is comparable with what the action of France would have been if, at the end of the Revolutionary war, France had made peace with England by demanding the cession of England's American colonies to herself. Leaving out of account the fact that France had entered into formal alliance with the colonists to aid them in securing independence, it seems to me, rather, that the demand of those who seek a joint protectorate for the natives is like a demand on the part of France, had she made it, that England's colonies should be left to the Indians under a joint protectorate. It is impossible, in such affairs, to leave out of account the demonstrated capacity of a people for self-government. Undoubtedly, the United States should, and undoubtedly we shall, give to the natives of the Philippines as great a measure of self-government as they are capable of exercising; but we could not in justice to civilization assume, in our treaty with Spain, a capacity for civilized government on the part of the natives which has never been shown to exist. It was the same Jefferson who wrote in our Declaration of Independence that government ought to rest upon the consent of the governed, and who argued for a strict construction of our national constitution, that purchased Louisiana from Napoleon without the consent of the people, sovereignty over whom was thus transferred to the United States; and also without any other constitutional authority than that which has been exercised in connection with the cession of the Philippines. That is the difference between Jefferson the statesman and Jefferson the philosopher. The philosopher stated the ideal, which I believe to be the ideal of the American people to-day as fully as it always has been; but the statesman did a great service to his country and to civilization, by doing a wise thing at a for-

tunate moment, although, in doing it, he contravened his own ideal. I freely admit that if the dilemma with which we have had to deal in the matter of the Philippines had been voluntarily and consciously sought, the outcome would have been discreditable to our good faith and alarming in its portent. Coming as it has, however, as an unintended result of a war with Spain having its origin in disturbances with Cuba, I believe the children have given the answer the fathers would have made in the like case. Unless civilization, under proper conditions, has a right to withhold control from barbarism and semi-barbarism, and to substitute for either something better, our own national life rests upon inexcusable wrong to the aborigines whose land we have taken, and for whose civilization, such as it was, we have substituted our own.

But others again say, that the American ideal is government "of the people, by the people and for the people;" and that, however truly we may give to the Philippine Islands a government for the people, it will not be and cannot be, under our authority, a government of the people and by the people. Undoubtedly in this aspect, also, the fact comes short of the ideal; but to say that, in the premises, we have no duty to civilization or to the Philippine Islanders is to claim that a self-governing democracy, by its very nature, is incapable of serving other peoples, except by its own example. I do not think so meanly of democracy. Yet I would not admit for a moment, even by implication, that the service of the American democracy to mankind has been hitherto anything less than a world service. I have no sympathy with any who speak with a certain air of apology of America's isolation in the past. No nation since the American republic was founded has influenced the history of all nations more importantly or more beneficially. Indirectly by its influence, and directly by its action, it has done more than any other country to substitute arbitration for war as a means of

settling international disputes: while its general success as a self-governing nation, sincerely devoted to the arts of peace, has given a profound impulse to democracy the world over. Neither do I believe that the short and successful war with Spain has changed the temper of our countrymen in a night. The equally successful war with Mexico produced no such result, and the inbred habit of a century is not so easily cast aside. Our mission, indeed, has been a world mission of the highest order. We have invited to our shores men of every European country and many others, to share with us in the development and civilization of a continent. Not even England's mission, with her colonies and dependencies scattered over the earth, has been more wide-reaching than ours. We have asked the people of the civilized world to join with us in developing a continent, and, in doing so, to learn with us the lessons and the art of self-government. We have also invited here the wealth of Christendom to take part in the development of our material resources.

It is noticeable that in the same eventful year of 1898 that has burdened us with new duties to people across the sea, we have become for the first time a creditor nation lending vast sums of money to the people of Europe. It is a striking and suggestive coincidence that at the very moment when our relations to the civilized world have changed financially, the obligation of duty to outside peoples, less civilized than we are, seems also to have been laid upon us. It is as if a Voice that admits of no remonstrance had said to us, in the plenitude of our prosperity and power: "Hereafter you must heed the call to service both with men and with money, away from home as well as at home." Certainly the change in our political relations is not more striking than that which has taken place in the domain of finance. To me it seems an evidence of the soundness of heart of the American people that they have unflinchingly accepted the heavy burdens devolved

upon the nation by reason of the war with Spain; and I do not see in the acceptance of these burdens any unfaithfulness to our past, or to what we stand for among the nations of the earth. It is possible, but by no means sure, that our material interests will be benefited by the course we have pursued. As I interpret the attitude of our people, they have taken up the task which seems to have been laid upon them, not stopping to question closely whether it will be advantageous to themselves or not, but determining to do it as best they can. How heavy a burden it already is, how heavy it may yet be, is witnessed by the mournful echoes of the guns in the Philippines that tell of what it is to stand in the shoes of Spain in the eyes of a semi-barbarous people. But if they have taken it up as a burden, they are determined no less to convert it into an opportunity.

In this discussion I have given no consideration to the constitutional questions involved, partly because, at best, these are matters of opinion, and no opinion that I might express would have any special value; and partly because the treaty with Spain has been ratified, so that we are already involved in whatever constitutional difficulties there are. There is no doubt that war with Spain has confronted us, both as to Porto Rico and the Philippines, to say nothing of Cuba, with questions that are wholly new to our experience. Without attempting to make any fine distinction between colonies and dependencies, some things are written upon this subject on the pages of history in letters of flame, to which we must not shut our eyes. England lost her American colonies, now the United States, because she attempted to control their trade in the interest of England. The mother country, having learned the lesson of this experience, has since become the great colonizing power of the world, because she has appreciated that colonies or dependencies, to be sources of strength, must be administered in their own interest. It is said that the

Bourbons never learn from experience; and Spain has evidently lost her possessions in the Antilles and the Philippines, because she has continued to do, down to this day, what caused the revolt of the American colonies from Great Britain in 1776. In other words, the colonies and dependencies of Spain have been places to be exploited in the interest of the mother country. The welfare of the colonies themselves has never been permitted to shape their policy or administration. It would be a ghastly act of folly, if, in the face of facts like these, we ourselves repeat with Porto Rico and the Philippines the mistakes which drove our own forefathers into revolution, and which have cost Spain her possessions in both the West Indies and the East. It is not clear that we are wholly free from the danger of precisely this mistake: not that the mistake is likely to be made deliberately and with malice aforethought, but that it may be made thoughtlessly, simply because the point of view, up to this time, has been wholly foreign to our vision. Our navigation laws, for instance, which confine the privileges of domestic commerce to vessels carrying the American flag, have been already extended to Hawaii and to Porto Rico. Looking at these places as parts of American territory, the action is natural enough; but if the policy be questioned from the point of view of Hawaii and of Porto Rico, it is by no means so clear that the policy is wise. Hawaii lies as far from our western shores as Southampton from New York. Porto Rico is half as far away. It is certainly a fair question for the inhabitants of Hawaii and of Porto Rico to ask what benefit they obtain from a policy which will arbitrarily confine their trade with this country to vessels carrying the flag of the United States. Our navigation laws have their origin in a conception of national advantage which affords justification for them from our own point of view; but I submit that the application of such laws to islands lying 1,500 miles and 3,000 miles away from our nearest port may wear a very different aspect to the inhabitants of those islands from what it wears to us.

Similarly, the tariff question is a question of vital importance from the same point of view. These islands are not now manufacturing centres, nor are they very likely to become so. It is evident, therefore, that the tariff for the Philippines and the tariff for Porto Rico might easily be one thing, if framed from the point of view of the islands, or another thing, if framed from the point of view of the United States. We ought not to forget, and I hope we shall not forget, that it was questions of this kind,—not precisely the same in form, but similar in tendency,—which led to our own revolution against Great Britain. I am sanguine enough to believe that, in the long run, our policy toward Porto Rico and the Philippines in these respects will be guided by the principles for which our own fathers contended; but there is undoubtedly a momentary danger growing out of the fact that the whole question is entirely new to our habits of thought. It is not an easy thing for a nation which has consistently pursued for a hundred years a policy of self-development to put itself suddenly in the place of distant islands with whose interests it is really unacquainted in any fundamental sense of the word.

The action of the President in sending a well-constituted commission to the Philippines to report upon these very subjects is worthy of the highest commendation. A similar commission, equally well constituted, might do equally good service in acquainting us with the problems with which we have to deal in Porto Rico. The West Indian Islands seem so near that it is natural to think of them as part of the American continent, and indeed they are much closer to us in all their interests than are the Philippines. On the other hand, Porto Rico, measured by miles, is really far away, and its historic development is as different from ours as possible. Because it is so naturally a part of the American continent we are apt to think that we know all about it, whereas our true wisdom lies, I am sure, in endeavoring to acquaint ourselves with its needs in the most careful manner possible.

In this connection, I am glad to emphasize a suggestion which President Gilman formulated a few months ago, that the universities of the country can render service of the highest value by encouraging their advanced students to look into all of these questions. The thing to be feared at the hands of the American people, in these new relations, is not so much mistakes of the heart as mistakes of the head—mistakes that will be made either because we fancy that we know what we do not know, or because it has not seemed worth while for us to take the trouble to learn. Therefore every contribution of knowledge that tends to the understanding of the problem will be most helpful, and in no quarter can we more hopefully look for such contributions than to the universities, and to the investigations of their advanced students of history and economics.

You will not imagine, I am sure, because I have emphasized first of all what seems to me a real danger in the situation, that I have any doubt as to the great service which the United States can do for the population of all of these islands, both in the West and in the East. We can give to them undoubtedly many of the things that we ourselves value most highly. We can give to them free schools and free speech ; freedom to worship God according to their own conscience ; and equality before the law. We can give to them, if we will, the opportunities that are born of a stable government, justly and equitably administered ; and certainly we can and we should develop everywhere the capacity for self-government up to the utmost limit of possibility. I have not the slightest doubt that these are the things which the American people as a whole intend to do for these islands which have come so unexpectedly under our influence. Neither have I any doubt that the most self-sacrificing efforts will be made by multitudes of our people to give both to Porto Rico and the Philippines, as well as to Cuba, of the very best that we have.

It ought not to be forgotten, however, that it is one thing

to intend to do a thing, and quite another thing to accomplish it. I have not the slightest doubt that a people who have maintained Roberts College in Constantinople for so many years, the influence of which, in due time, undoubtedly led to the freedom of Bulgaria and Roumania from the Turkish yoke, will carry the torch of education far and wide throughout these islands. I have equally little doubt that the spirit of our laws will be embodied in any legislative action that we may take with reference to these islands. The critical question is, what sort of administration shall we provide during the period, whether it be long or short, in which we must be ourselves directly responsible for results. If we want instruction on an engineering subject we must go to an engineer; and if we want information on a question of commerce or of agriculture we must go to men who have made a careful study of the problems in business or farming about which we wish to know. Similarly, if we want to learn how to administer colonies and dependencies wisely, we must study the methods of the one great power of modern times which has made a good record in this field of enterprise. We may indeed study also, and we should, the efforts of other countries in similar directions which have been less successful; for, by such a comparative study of the question, we shall be able to learn absolutely the conditions upon which success in these enterprises depends. Such a survey of the history of the colonies and dependencies of our time will lead us surely to one conclusion—that if we are to do any real kindness to these distant people whose lot is now measurably identified with our own, and if we wish to avoid occasions for shame which will make us a by-word among the nations, we must develop a colonial service with permanency of tenure that will offer a life career to many of the talented and promising men of the land. No country in the world, not even England, I believe, abounds more richly in the material available for such a service; but you cannot obtain

the services of such men unless you make the conditions of the service such as will attract them. The Supreme Court of the United States has always been able to command the services of many of the best legal minds in the country—not because a position on the bench of the Supreme Court pays a large salary, for it does not; but because of the honor of the position, because of its permanency of tenure, and because of its provision for old age. If you were to subtract from these conditions the permanency of tenure, the quality of the judges composing the Supreme Court of the United States would suffer a rapid and fatal deterioration. If you were to deduct both the permanency of tenure and the provision for old age, not even the high honor of the appointment could long secure the quality of service, even in this highest court of the nation, which we have enjoyed in the past.

Similarly, a colonial service that is constantly changing, and which offers no permanent career to young men of promise who may embark upon it, is as sure to be a failure as anything can be. It is indeed one of the great drawbacks to the public service of the United States in any capacity, that it does not offer, under existing conditions, to young men who are inclined to follow it, a permanent career, simply upon the basis of good service to the public. Something may be learned even from Tammany Hall in this regard, which does offer permanency of opportunity, in one form or another, to those who are loyal to the organization. The difficulty is, in this case, that the permanency comes from loyalty to the organization, not from efficient and loyal service to the commonwealth. Tammany also demands for its own service peculiar efficiency and skill. Some day the people will realize that they cannot afford to be less careful of their own interests than Tammany is of its own. When this day comes the people will not only create but sustain, in all departments of the public service, a system that will make it worth while for young men of

promise to enter into the service of the State and of the community with the expectation of making that their life work. It must be made their life work upon conditions, also, that make permanency of tenure depend on service to the public, not upon service to any political organization less comprehensive than the public. Unless we can do this for our colonies, we shall add only one more failure to the melancholy history of colonial enterprise. If we do it for our colonies, we may well hope that the demonstrated advantage of it will tend to elevate and improve our own civil service at home.

Looking out upon the country at the present time, we must thankfully recognize that we are passing through an era of almost unexampled prosperity. Our arms have been crowned with brilliant victory both on sea and land in our recent war with Spain; and our trade and industry, as shown by the phenomenal record of exports and of imports, have won almost as decisive victories in all the markets of the world. In contemplation of these peaceful achievements, one may indeed exclaim, "Peace hath her victories no less renowned than War." Such a moment is a moment of great opportunity and of peculiar danger. The danger is that the ideal life of the nation shall suffer hurt in the presence of such abounding prosperity. If it is hard for a rich man to enter into the kingdom of God, it is no less hard for a rich nation. It is pleasant, when wealth increases, to strive for more wealth; and it is easy, in the midst of plenty, to leave the hard tasks of the world to others. In this light I think we may well be grateful, rather than disturbed that, at a time when our material prosperity is so conspicuous, there should have been laid upon our shoulders some of the burdens of the world that our brothers across the sea have been carrying in the effort to improve and elevate the civilization of the race. It may well be true, in the Providence of God, that this young nation, inhabiting a continent, which has so far

mastered its material environment as to become a creditor nation, must owe return in service as well as money, directly as well as indirectly, to the cause of civilization throughout the world. I plead especially with the young men at a time like this to keep bright their high ideals; to be willing to serve society and the State as Washington did, unselfishly, and not to permit themselves to be warped by any dream of wealth from this ideal service. If there be, also, here men who are wealthy as well as young, I beg them to consecrate wealth and life alike to this ideal service. The country at home and abroad needs such service in a thousand forms.

“ Then, welcome each rebuff
That turns earth’s smoothness rough,
Each sting that bids nor sit nor stand, but go!
Be our joys three parts pain!
Strive, and hold cheap the strain ;
Learn, nor account the pang ; dare, never grudge the throe! ”

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PROCEEDINGS OF THE CORPORATION.

At a stated meeting held on February 7, the following business was transacted :

The Provost was authorized to extend an invitation to the Association for the Advancement of Science to hold its meeting in 1900 at the University ; and also to arrange for lectures as follows : by Mr. Ellis Yarnall, on "The Children of Samuel Taylor Coleridge"; and by M. Edouard Rod, on "French Literature." The title of the chair of "Comparative Embryology" was changed to "Zoölogy." Three additional scholarships were established in the College in the names of (1), "E. Otis Kendall," (2) "John White Field," and (3) "Francis Peters of Philadelphia." Two additional free beds were established as follows: in the Hospital, "The John White Field Bed;" and in the Maternity Hospital, "The Abby Willing Peters Bed." The name "Hamilton's Walk" was officially adopted as the designation of the new walk from Thirty-sixth and Pine streets to Woodland avenue. The following appointments were, upon nomination, confirmed: Professor Joseph French Johnson, A. B., to be Lecturer on Monetary Problems in the Faculty of Philosophy (Graduate School); Rev. Hugo Radau, Ph. D., to be Honorary Fellow in Assyriology. Elections were held as follows: Frank Edson Perkins, S. B., *Diplômé du Gouvernement Français*, to be Assistant Professor of Design; and Jacob Mandes Da Costa, M. D., LL. D., to be a Trustee of the University, vice James McAlister, LL. D., resigned. Thanks were voted to the following donors: Walter Cope, for \$1,000 to the John Stewardson Traveling Scholarship in Architecture Fund; Evans R. Dick, for \$2,500 to the Kendall Scholarship Fund; and to the executors and children of the late Rev. Dr. S. B. Wylie, for a collection of books.

At a stated meeting held on March 7, the following business was transacted:

The resignation of John B. Deaver, M. D., as Assistant Professor of Applied Anatomy, was received and accepted. Simon Flexner, M. D., formerly Associate Professor of Pathology in the Johns Hopkins University, was elected Professor of General Pathology and Morbid Anatomy. The appointment of James Parsons, Esq., as Emeritus Professor of Law, was approved. The appointment was announced of Mr. Eugene Ellicott as Assistant to the Provost. The annual statement of the Trustees to the Legislature of the Commonwealth was read and approved. Thanks were voted to the donors of funds.

OBITUARY.

Ezra Otis Kendall.

The following minute was adopted by the Corporation at a meeting held on January 10, 1899:

In the death of Ezra Otis Kendall, LL. D., Thomas A. Scott Professor of Mathematics, Honorary Vice-Provost, and Honorary Dean of the College Faculty, the University of Pennsylvania has lost an officer venerable in years of service, and distinguished for his attainments and achievements in science; and chiefly memorable for the personal qualities which, for the last forty-four years, have endeared him to the University and to the community. Entrusted in his earliest manhood with a responsible professorship in the Central High School of Philadelphia, in which he inaugurated and maintained an astronomical service of the highest value, he was in 1855 elected Professor of Mathematics and Astronomy in the University. In 1883 he became Vice-Provost and Dean of the College Faculty, relinquishing the active duties of these positions in 1894, when the titles were made honorary.

He was a teacher of rare excellence in his department, and his didactic work was but a part of the service which he rendered to a long succession of College students. His manifest nobility of character, his kindliness and his patience, invariably won their respect and often their warm affection, and his influence upon them was far-reaching and beneficent.

His colleagues in the Faculty have given warm and just expression to the honor and affection in which they held him; and the Trustees, of whom a majority were some time his pupils, gratefully record this memorial of the learning, the wisdom, the purity, and the gentleness that characterized his long and useful career in the University.

The following minute was adopted by the College Faculty, and concurred in by the Faculty of Philosophy :

I. *Resolved*, That the following minute be entered on the minutes of the College Faculty:

The College Faculty of the University has received with deep emotion the announcement of the death of Dr. Ezra Otis Kendall, Thomas A. Scott Professor of Mathematics, Honorary Vice-Provost of the University and Honorary Dean of the College Faculty. It is deemed fitting at such a moment to place on the records of this Faculty a minute expressive of the high esteem in which Dr. Kendall has always been held by us, his colleagues ; and of the deep sense of personal loss with which we have received the sad news of his death.

Professor Kendall was officially connected with the University for upwards of forty-three years. He entered this Faculty in the year 1855, as Professor of Mathematics, and held from the time of its foundation the Thomas A. Scott Professorship in that subject; and, up to the date of his retirement in 1894, the Flower Professorship of Astronomy. In 1883 Dr. Kendall became Vice-Provost of the University and Dean of the College, which latter position he filled until 1889. Besides the publication of a number of text-books, Dr. Kendall was one of the earliest American mathematicians to give especial attention to the study of astronomical sciences in his practical work as Director of the Observatory of the Philadelphia High School. Dr. Kendall was also for years in charge of the preparation of

the Ephemerides of Jupiter and his Satellites for the "Nautical Almanac."

Endeared to his students by his kindly and unceasing interest in their welfare, and by his uniform diligence and success in the performance of his duties as a teacher, Dr. Kendall played an equally important part throughout his career in the government of the University and in the shaping of its policy, alike in his capacity as a member of this Faculty and of the Faculty of the Department of Philosophy; and in the efficient performance of his duties as Dean and as Vice-Provost.

II. *Resolved*, That the Faculty attend the funeral of Dr. Kendall in a body.

By the members of the Faculty of Philosophy then present, it was resolved:

That the Faculty of Philosophy concurs in the adoption of these resolutions of the College Faculty, and

That the Dean of the Faculty of Philosophy be authorized and directed to sign them as its official representative.

THE NEW MEDICAL LABORATORIES.

The Medical School of the University is the oldest in America, and in its history has exemplified every phase of medical teaching in the last one hundred and forty years. It has very generally been the pioneer in the many reforms and improvements that have been made in that teaching, and the movement now on foot for the extension of its laboratory system indicates the immense change which has been made in the scheme of medical education. When the school was first established, one or two rooms of moderate size were all that were needed for its accommodation, not alone because of the small number of students, but on account of the method of teaching. Text-books were few and inadequate. The professor himself was the fount of all and the latest knowledge, and the whole of medical education was included in "attending lectures." Even

Practical Anatomy was no exception. Only one dissecting table was needed, for the professor alone did the dissection, with his little group of students gathered close around him to watch his careful demonstrations. The cadavers could be obtained only with great difficulty and some danger, preferably on a dark and stormy night, and could not be wasted by being given to untrained students. In the course of time this, the most mechanical part of medical study, was provided for on the laboratory plan; and for many years ample dissecting rooms and abundance of material have been provided, and a large amount of individual work has been required of every student. A school in which anatomy was taught only by text-books, lectures, diagrams and manikins would now justly be regarded as an absurdity. Gradually it has been learned that the same principle that now governs anatomical instruction can be, and ought to be, applied to all branches of medical science. One of the first consequences of the removal of the University from its narrow quarters on Ninth street to the ample grounds in West Philadelphia, was the erection of such spacious chemical laboratories that ample room was provided for the individual work and instruction which is now needed and required before a medical diploma can be given. Year by year the principle has been extended to other branches of study, as facilities were available. Rooms in Medical Hall were devoted to practical work in Physiology, in Histology, in Pathology, and in Pharmacy, and every effort made to supplement the formal lectures on these subjects by individual and practical instruction; and no parts of the medical course were more interesting, more appreciated, or more valuable. But the restricted space available greatly hindered the development of this work. The great body of students had to be broken up into small sections: each of these could have only a fraction of the time which ought to be given to the subject, and far more labor was imposed upon instructors than was right or desirable.

It is now proposed to make a vigorous effort to give the Medical Department of the University the full facilities that are needed for this modern system, which has germinated within her walls and now demands room for expansion and growth. The Laboratory of Hygiene must be enlarged to admit the working of the system there, so far as the important subjects of Bacteriology and Hygiene are concerned. Then a large building is to be constructed, affording to Physiology, Pathology and Pharmacodynamics, not only rooms for special research, but also for such facilities in these subjects to every student of Medicine as those which he now enjoys in the study of Chemistry. Didactic lectures will still have their place, and a very important place. There is a certain effectiveness in the oral teaching of the right kind of a man which does not find place in any other method. Text-books will still be used ; but they will not be used merely for the purpose of dry recitation. They will be "Baedekers" in the hand of the tourist who is seeing for himself and exploring for himself, and verifying measurements, and taking his own photographs ; and meanwhile learning to do his own thinking. For the earlier years of the course the student will live in the laboratories, so that he may worthily live in the hospitals in the later years. The microscope is no longer a toy, nor merely an impressive ornament to the physician's office. It is an indispensable tool, and subsidiary to it and associated with it are other instruments of precision absolutely essential in many cases to a proper investigation or a right diagnosis. And although some of these will never enter into the field of ordinary practice, the very philosophy of their construction and use will make clear to the students' mind some point in Physiology or Pathology which would not be clear without it. The time will never come when the general practitioner will carry a sphygmograph on his daily rounds ; but the one who has had some experience in adjusting that instrument and in reading its tracings

will ever after have a more definite conception of the conditions revealed to him by tactual observations of the pulse. Our Veterinary students may never have to make a horseshoe professionally ; but they must know how to make one before they graduate, and must spend a part of their time in Professor Enge's interesting laboratory. The laboratories, with their means and methods, are to plant in the students' minds the *science* of Medicine, and to fit him to discover for himself, or to receive from others, whatever additions there may be to that science. The hospitals are to teach him the *art* of Medicine ; and we may fairly assume that the more thorough is the scientific grounding, the fairer and more effective will be the superstructure of that most beneficent art which our graduates go out to practice. Tentative plans have been prepared, and it is not unlikely that they will be adopted, at least in their general features. They indicate a noble building, and one which would be an ornament to the great group which the University is gradually assembling. The Medical alumni, who can better appreciate than any others the urgent need and inestimable value of such an addition to the medical plant, are taking a lively interest in the matter ; and the earnest plea made by the Provost in his last Report ought to kindle an interest in the subject in the minds of all who desire to see the University hold that pre-eminence in medical education which is one of her proudest traditions.

AUXILIARY LECTURES BEFORE THE DEPARTMENT OF LAW.

Last fall the Committee on Auxiliary Lectures of the Law Department of the University of Pennsylvania, arranged for a series of lectures upon subjects of Jurisprudence, International Law, Legal History, etc., to be given during the winter months; the lectures to be delivered by prominent members of the Bar, the course to be open to all students of the University and invited guests. The lectures are held in the old House of Repre-

sentatives' Chamber in Congress Hall, Sixth and Chestnut. During January, the Honorable William Wirt Howe, of New Orleans, La., delivered a series of six lectures on Civil Law.

On Thursday, January 5, he delivered the introductory lecture to the course, entitled the "Sketch of Roman Law and Its Influence in England and America. It consisted of a brief sketch of the origin and history of the Roman Law, and its extension and development into what is known in our times as the Civil Law in France, Spain, Germany, Scotland, Lower Canada, Louisiana, Mexico, South America and the islands of the sea. It was followed by a detailed statement of the historical effect of the Roman Law on that of England, especially in such matters as succession to personal property, admiralty, corporations, equity, and even such matters as juries and habeas corpus.

The second lecture was upon the "Law of Persons," with reference to decisions in England and America. He followed the division suggested by Gaius's "Jurisprudence" concerning persons, things and actions; persons who possessed rights and incur liabilities; things which are the object of these rights and liabilities and actions by which rights are vindicated. Judge Howe then took up the first division of persons, viz. : natural and juristic. Under natural persons he treated of those who were free and those who were not free, and those who are *sui iuris*, and those who are *aliene iuris*; of those who retained what was called the caput or total personality undiminished, and those who might be degraded from such condition. Under juristic persons, he spoke at some length of corporations and other juridical beings, and closed with the description of the idea of a partnership as a legal entity.

The third lecture was on the "Law of Things," with reference to decisions in England and America. He made the following division of things, namely: sacred and secular; corporeal and incorporeal; movable and immovable; *mancipi* and *nec mancipis*: in commerce and out of commerce, and private and public. The Doctrine of Property in Things was then taken up by the distinction emphasized between the *jus in re* and the *jus ad rem*; and among other *jura in re*, servitudes or easements were dwelt on as important. As for the control and use of property by its owner, it was pointed out that this was

always subject to police power, concerning which the classical jurists and modern civilians were very instructive. Eminent Domain was also discussed as recognized in the Digest and Code of Justinian and in modern law. As for the acquisition of property, it was pointed out that many of the rules of the Roman Law are still fundamental in our modern conceptions. Thus the modern rules as to property in game and wild animals are the same substantially as those of Rome, except where modified by specific statutes. On this point reference was made to *Mullett vs. Bradley*, N. Y. Supreme Court, decided last autumn, and *Herr vs. Connecticut*, 161 U. S., 519. The lecture was concluded with references to the doctrine of "privileges by prothecation" in Roman Law, as directly related to the modern admiralty lien, and in a way to the modern equitable lien.

The fourth lecture, which was perhaps the most interesting of the course, was upon the "Obligations in the Civil Law," with reference to the Common Law.

A division was noticed of the obligation into imperfect, natural and perfect. The perfect obligation was defined in the language of the Institutes of Justinian as "a legal chain whereby we are bound, of necessity, to pay something according to the laws of our country"—it being understood, of course, that the word "solvere," thus translated "pay," meant to untie, discharge and perform by any method. It was then pointed out that an obligation must not be confounded with a contract. They bear the relation of effect and cause. Every valid contract creates an obligation; but every valid obligation does not proceed from a contract. There are logically five sources of obligations, namely; contracts, quasi-contracts, offenses or torts, quasi-offenses or neglects, and the arbitrary obligation of a law. The lecturer then proceeded to deal with contracts from the point of view of Roman and Civil Law; and noticed the various logical rules and divisions. Emphasis was laid upon what is essential to a contract, what is natural and what is merely accidental. It was pointed out also that some contracts are called certain and some aleatory—insurance being an example of the latter. A Roman division of contracts was explained, by which they were either real, as

requiring actual delivery, as a pledge verbal, being made by the use of certain essential words; literal, as resulting from certain book entries or writings; and consensual, as being perfect by mere consent. The lecture was concluded by a statement of the four requisites of a valid contract, namely: (1) parties legally capable of contracting; (2) their consent lawfully given; (3) a certain object which forms the matter of the agreement, (4) and a lawful cause or motive. The doctrines of the lecture were illustrated by decisions from Belgium and France and by cognate cases in the United States.

The fifth lecture was on the obligations arising *quasi ex contractu* with reference to the Common Law. The following is a brief synopsis of the ground covered: the lecturer first pointed out that the term quasi, while denoting a resemblance, implies also a difference. A quasi-contract is not a true contract or even an implied contract. The obligation *quasi ex contractu* springs from some lawful act or fact, which, in the absence of agreement, imposes a legal duty capable of enforcement by proper proceeding. "A leading source of obligations *quasi ex contractu*," said Judge Howe, "is found in the doctrine of Unjust Enrichment, referred to by Pomponius in the Digest; and there are cases where, when one has taken necessary and useful care of, or expended money on, the property of another, he may have a claim *quasi ex contractu*." Reference was made to the subject, also of payments made in error of fact, and the right of recovery in such cases. Judge Howe said:

"Herein is another obligation that arises *ex contractu* in the recovery of money paid to another, on the ground that it is not due; we do not refer to any question of mere term of payment. In the jurisprudence of England and the States of our Union, many examples exist of money recovered after being duly paid: but in order to recover money thus paid in England, New York, and, I suppose, in Philadelphia, the payment must not have been a voluntary one; it must appear that it is against good conscience to retain the sum paid; the payment must not have been made in compromise of a disputed claim; and, in general, the alleged mistake must have been one of fact and not merely one of law."

Allusion was made to the quasi contractual obligation in

cases of general average and salvage, and the lecture was concluded with a reference to the theory of judgment, in the civil law, the character of which, in any true analysis, must be determined, said the lecturer, by the character of the obligation which they respectively enforce. Reference was made to several authorities in England and America on the general topic.

Judge Howe closed his series of lectures on Friday, January 20. His last lecture was upon "Obligations Arising *ex-Delicto* and *Quasi ex-Delicto* with References to the Common Law." He stated these terms would be nearly equivalent to such phrases as active torts and passive torts or neglects, an offense involving the idea of positive wrong by some act of commission; while a quasi offense, as a general rule, is negative in its character, and results from some omission of that care or prudence which the situation may have required. Reference was made to the division of the law of torts in the Roman law into four classes. (1) The unlawful taking of the property of another; (2) the taking of moveable property by violence; (3) injury to the property of another whether wilful or by mere neglect (a subject which was embraced in what was known as the Aquillian law, a plebiscite adopted about four hundred and sixty-seven years after the foundation of the city); (4) *injuria*, which might include either injury to the person, as assault and battery, or injury to his personal rights, like a slander or libel. Examples were also given from the institutes of Justinian of various cases of quasi offenses or neglect.

Coming down to later civil law as developed in Continental Europe, and represented, for example, by the Codes of France, Judge Howe said the subject might be conveniently summed up as follows: (1) Every act of man which causes damage in the legal sense to another imposes an obligation on him by whose fault it happened to repair such damage. (2) Every person is thus responsible for the damage he causes, not merely by a positive act of commission, but for his negligence, imprudence or want of skill according to the circumstances of the case. (3) Every person is responsible not only for his wrong or neglect, but for the wrongs or neglect of persons in his employment or under his control, under regulations or limitations estab-

lished, as a matter of public policy. (4) The owner of an animal, even may, in certain cases, be liable for injury done by such animal.

In the opinion of the lecturer, these general rules will be found, on examination, to include and illustrate a large part of the modern law of torts and negligence in England and America. It was pointed out that the importance of the word "fault" in the first rule must be noted. An obligation is not imposed for every act of omission. The phrase "every act" is controlled by the word "fault," and it results that the party bound or the person for whom he is bound must be in fault; that is to say, his condition must be in the general sense of the word unlawful.

Recurring again to the general proposition that every act of man which causes damage to another entails an obligation on him by whose fault it happened to repair that damage, the lecturer said: "We must also lay emphasis on the word 'causes,' as used in connection with the word 'fault.' We may even be in fault, and yet that fault would cause no damage to anybody in any legal sense; or we may be in fault and we may not cause any damage to the particular person who is complaining in a special case; or we may be in fault and yet the determinative or deciding cause of damage may really be the fault of the complaining person himself; and, finally, we may be in fault and that fault may in the legal sense be the cause of damage to the particular person complaining of the kind, and to the extent of which he makes his judicial demand, and then the obligation would be complete."

The subject of contributory negligence was discussed; and in conclusion Judge Howe contended that whatever the fault may be, the damages to be assessed should be only those which in the original and judicial sense are caused by the act or omission as an approximate result; and that the allowance in some cases of what are sometimes called exemplary damages are governed really by the same principle, such damages being not really intended to repair the direct consequences of wanton wrong which the wrongdoer might more easily foresee than he could foresee the results of further neglect.

Hon. William Wirt Howe was born in Canandaigua, N. Y.

He is a graduate of Hamilton College, Clinton, N. Y. His law studies were pursued in St. Louis and New York. In 1861 he enlisted in the Union army, where he attained the rank of major of cavalry. In 1865, he was admitted to the Bar of New Orleans, where he was afterward made a Justice of the Supreme Court of Louisiana; and, after having sat upon the bench for five years, he returned to practice law, which he still pursues. He is the author of "Studies in the Civil Law," which was published by Little, Brown & Company in 1896, and of a "History of the City Government of New Orleans," published in 1890 by the Johns Hopkins University Press. He is president of the Board of Civil Service Commissioners of New Orleans and counsel of the Drainage Commission of that city as well as of several railway and insurance companies. He was at one time the treasurer of the University of Louisiana and president of the Historical Society of that State.

As a lecturer, he is not only very interesting, but evidently a master of the subjects upon which he speaks in such forceful and eloquent style.

During March, Talcott Williams, LL. D., will deliver three lectures on questions of International Law; and the Honorable Edward A. Armstrong, Judge of the Common Pleas Court of Camden, will lecture upon the "Early History of the Courts of New Jersey." A synopsis of these lectures will appear in a later number of the BULLETIN.

COLLEGE AND UNIVERSITY LIBRARIES.

[Abstract of a talk given by Ernest C. Richardson, Ph. D., Librarian of Princeton University, before the Pennsylvania Library Club, in the Library of the University of Pennsylvania, January 9, 1899.]

Of 175 libraries in the world numbering over 100,000 volumes, 74 are university libraries, and 8 of these are American. Foreign university libraries in general excel in the number of books, American in administration; but many of the European universities equal the best American administration in some respects, *e. g.*, Vienna, Gratz, Halle, Leipzig, Strassburg, etc. On the other hand, some of the foreign libraries are behind our worst. Some, *e. g.*, require a book to be called for the day before it is to be taken out, and many are mere fire-traps.

American university libraries, therefore, though smaller and absolutely insufficient to needs, are relatively rather more efficient than numbers indicate.

About the year 1800 there were 11 college libraries in America which were thought worth mentioning, with a total of 32,500 volumes. Thirty years later the number was 43, and the total 129,318; in 1860 (1859) 244, with a total of 1,241,328, and in 1890, 430, with a total of 4,524,502. In 1897-98 the 55 largest university libraries in America contained 3,557,156, or about the same as the total number contained in all the 10,199 public libraries of 1859. In 1860 there were 9 university libraries containing more than 45,000 volumes, 4 containing over 100,000 volumes; in 1897-98 there were 25 university libraries with over 40,000 volumes; 18 with over 60,000, and 8 with over 100,000. Of the 500 college libraries to-day about 100 have more than 15,000 volumes. Harvard has grown from 13,000 volumes in 1800 to 500,000; Columbia from 3,000 to 250,000. The most rapid growth is that of Chicago, which has 306,000. The most rapid growth among the older colleges has been that of the University of Pennsylvania, which has increased from 5000 to 135,000, or twenty-three fold, since 1860. The order of size among the eight is Harvard, Chicago, Columbia, Yale, Cornell, University of Pennsylvania, Princeton, Ann Arbor; the order of real efficiency slightly different.

Library problems vary chiefly according as the aim of the library is the increase or the dissemination of knowledge. The college library aims primarily at the dissemination of knowledge; the university library at both research and dissemination. For the common function of dissemination the library needs the very latest and best reference books and systematic treatises, decent editions of all the classics of literature, and some provision so that all this limited class of best books on all subjects may be actually handled by the individual student. The production of new knowledge involves the additional factors (*a*) of obtaining as nearly as possible every book of value; (*b*) strict classification, and (*c*) more minute and accurate cataloguing.

Some problems involved are:

(1) *The immense number of books required for research.*

Paris has 3,000,000 volumes, the British Museum, 2,000,000;

and yet neither is complete in any line of research. Even 5,000,000 carefully selected volumes would not fully cover the need. Harvard has 500,000 volumes, increases 15,000 or 20,000 a year, has splendid helps in the Boston libraries; and yet does not consider this adequate to her needs. The German government added to the university library at Strassburg 750,000 volumes in twenty-five years; yet the Strassburg professors find this inadequate.

American university libraries can help one another by co-operation, through specialization and co-operation in loaning.

(2) In *the selection of books* the librarian is helped by the professors. The money for books is often apportioned among them; but for economical upbuilding a good share of the money must be at the free disposition of the librarian to buy, when they can be gotten cheaply, books that will be wanted sometime.

(3) *The building*. For the students the problem is met by a spacious reading room, with a good collection of the best books. For research, it is met by the compact stack: the more compact the better

One of the most important problems is provision for seminary work or instruction in research in the immediate vicinity of the books.

(4) *Hours of opening*. Not so many years ago one hour a day was the rule: to-day it is held that the library should be open from 8 a. m. until 11 p. m.

(5) *The reference librarian* chiefly aids students in essay and debate work and individual investigation, but also is found to greatly economize the time of the professor and advanced student.

(6) *The loan of books*. Practically all libraries except Cornell loan out books to students. The usual number is two or three for undergraduates; in the case of the professor they may be loaned by the cartload. There should be no limit except the number that a man can use to good advantage.

Quickness of finding and delivery is one of the great studies of the modern librarian.

(7) *University publications*. Dr. Adler, of Washington, maintains the common sense position that the librarian should have at least such connection with the university publications

as shall insure that proper results accrue to the library from the system of exchanges.

(8) *The staff.* The increase of libraries calls for an increased amount of general and special knowledge on the part of the staff. The larger libraries ought to have at least two or three college graduates of the best quality, perhaps such a man at the head of every department, Reference, Ordering, Cataloguing, Delivery, Curator of Manuscripts and Rare Books, or even if practicable, such specialists for each grand division of the sciences.

With the increase in attainments required the librarians come to have the same rank with the members of the faculty, and this may develop into a staff forming a sort of faculty by itself.

(9) *College instruction in bibliography.* Many attempts have been made in this line. In some cases the librarian gives quite a systematic course in the book sciences. Technological library education is amply cared for at such schools as Albany, Drexel, Pratt, etc. It is possible, however, that with a competent staff systematic instruction in the book sciences might be undertaken, both for undergraduate and postgraduate work.

(10) *The place of the library in the university.* This is involved in the idea of a university. The university trains the gentleman and promotes research. For the former, the reference library is most important. For the matter of research, the library is itself the laboratory in the historical and philological sciences, and even laboratories of natural sciences are useless without it. There is no substantial advancement in knowledge in the laboratory except as it is built on the accumulated results of all previous experimentation in these lines; and experiment is itself fruitless for the further advancement of knowledge except as it is embodied in literature and gathered with the rest of the material on the subject. The library is the *sine qua non*, therefore, for both functions, and the character and extent of university prestige and influence will depend in a very large measure on the quality of the library. It is a commonplace of modern educational expression that the library should be the centre and heart of the university; that the library building should stand as near as possible in the centre

of the campus, and typify its function as the centre of the life of the institution.

The librarian will find scope for every particle of energy in making his library fulfill its function in the university. Those universities whose friends have the most comprehensive conception of the value of library in the institution will be the ones which tell most in the fight for civilization.

NOTES.

Hygiene.

There has been organized in the Laboratory of Hygiene a Weekly Conference. The object of these meetings is to encourage closer personal relations between the students and their instructors; to discuss matters of special scientific interest to workers in the department, and to draw attention to important advances that are being made in the fields of Hygiene and Bacteriology. The first meeting was held Thursday, December 15, 1898, at 10 a. m.

The subjects that have been presented for discussion at these meetings have been :

Nutrient Culture Media in Bacteriology; with the Scientific Reasons for Their Various Compositions. By Dr. D. H. Bergey.

A Sketch of the Earlier Controversies concerning the Underlying Causes of Fermentation and Putrefaction. By Dr. George C. Küsel.

A Review of the Investigations upon Water Purification at Louisville, Ky. By Mr. William Easby, Jr. (See page 217.)

The Theory of Electrolytic Dissociation in its Bearing upon the *Modus Operandi* of Chemical Disinfection; a Review of the Work of Krönig and Paul on this Subject. By Miss Mary E. Pennington. (See page 232.)

Weigert's Doctrine of Tissue Equilibrium and Hyperplasia.

Wassermann's Observations upon the Specific Affinity of Tetanus Toxin for the Cells of the Central Nervous System.

Ehrlich's "Side-Chain" Theory ("Seitenkettentheorie") of Immunity. By Dr. A. C. Abbott.

Architecture.

"A change has been made in the Architectural Department of the University of Pennsylvania, Professor Edgar V. Seeler, who has for the last five years had charge of the work in design, retiring to devote himself entirely to private practice, and being succeeded by Mr. Frank Edson Perkins, a graduate of the Massachusetts Institute of Technology and a Diplômé of the School of Fine Arts in Paris. Mr. Perkins has had a brilliant record in the School of Fine Arts, his name appearing with great regularity among the winners of the various school honors; and his appointment gives assurance that the reputation already won by the University of Pennsylvania among American architectural schools will be well maintained."—*American Architect and Building News*, Jan. 7, 1899.

Languages.

The fourth stated meeting of the Language Union was held on Thursday, February 2, Professor W. A. Lamberton presiding. Papers were presented by Dr. William N. Bates instructor in Greek, on "Dionysus ἐν Αἰγυπτῷ;" and by Mr. C. W. Prettyman, instructor in German, on the "Syntax of the Noun in the Milstat Genesis." Abstracts of these papers will be found elsewhere in this issue.

ZOOLOGICAL STATION AT NAPLES.

The attention of those interested is called to the following circular of information recently issued by the Association for Maintaining the American Women's Table at the Zoological Station at Naples:

The Executive Board of the Association for Maintaining the American Women's Table at the Zoological Station at Naples wishes to call attention to the opportunities for research in zoology, botany and physiology provided by the foundation of this table.

The Zoological Station at Naples was opened by Professor Anton Dohrn in 1872 for the collection of biological material and for the study of all forms of plant and animal life. Under the personal direction of Professor Dohrn and his assistants the Station has developed into an international institution of great importance for scientific research and for the professional training of professors and students of all countries. The annual support of a table for research costs \$500 and entitles the government or association supporting it to appoint to the table qualified

students, who are furnished by the Station with all materials, apparatus and assistance free of cost. It often happens that one table is used by four or five biologists in the course of a year. The United States at present owns but three tables, that of the Smithsonian Institute, the University Table and the American Women's Table.

The American Women's Table is maintained by annual subscriptions; in the year 1898 subscriptions of fifty dollars each were received from the following associations, colleges and private individuals: The Association of Collegiate Alumnae, Brown University, Bryn Mawr College, The Committee on Science-lessons of the Women's Education Association of Boston, Massachusetts Institute of Technology, University of Pennsylvania, Radcliffe College, Sage College (Cornell University) Miss Lilian V. Sampson, Smith College, Vassar College, Wellesley College, Mrs. John H. Westcott, and the Woman's College of Baltimore.

Every appointee of the Association is known as the Scholar of the Association for Maintaining the American Women's Table at the Zoological Station at Naples. The Scholars of the Association are appointed by the Executive Board, with such expert advice as may seem to the Executive Board necessary, and the appointment is made for a longer or shorter period as may in each case seem expedient. The Executive Board has at its disposal a small fund for the purpose of aiding Scholars of the Association in need of financial help to meet the expenses of travel and residence in Naples. *Well qualified women will be appointed in preference, but if no suitable women present themselves men will be eligible in their stead.*

Full information in regard to the advantages offered at Naples may be obtained by addressing the Secretary of the Association, Miss Ida H. Hyde, 1 Berkeley street, Cambridge, Mass., who studied at the Zoological Station; Professor Mary Alice Wilcox, Wellesley College, Massachusetts, the first Scholar of the Association; or Miss Florence Peebles, Cook's Office, Munich, Germany, European Fellow of Bryn Mawr College, the Second Scholar of the Association.

Applications for the use of the table should be made as long in advance as possible, and the Secretary of the Association should be notified as soon as candidates know approximately when they wish to study in Naples.

THE FILTRATION OF WATER AT HIGH RATES, IN THE LIGHT OF INVESTIGATIONS MADE AT LOUISVILLE, KY.

By William Easby, Jr., C. E.

Instructor in Civil Engineering, University of Pennsylvania.

[Read before the Weekly Conference of the Laboratory of Hygiene, Jan. 12, 1899.]

It is becoming a recognized fact that the physical nature of a water, and its chemical and other impurities, may give it sufficient individuality to demand for it a treatment in the

process of filtration differing to some extent from that required for any other water. In many waters the physical, chemical and biological characteristics are themselves often subject to such wide variations that no system of filtration which is not susceptible of a ready adaptation to these changes can prove economical.

The Louisville Water Company, in an effort to solve the problem of water filtration as presented at Louisville, entered, in October, 1895, upon a comprehensive series of investigations of the results furnished by high-rate filters. These investigations were directed by Mr. George W. Fuller, formerly biologist in charge of the Lawrence experimental station of the Massachusetts State Board of Health. The results obtained from the English, or slow filtration, beds at Louisville, about ten years earlier, were so unsatisfactory that a further investigation of this system was not included in the scope of Fuller's inquiries, which were thus practically limited to the American or high-rate system—the only other commercially successful method of water purification on a large scale.

Filtration systems were installed on premises of the Louisville Water Company by several manufacturers of high-rate filters. In each case the nominal capacity of these plants was 250,000 gallons in twenty-four hours, or approximately 100,000,000 gallons per acre per day with the area of sand beds used. This was considered a large enough quantity to involve all of the elements entering into the practice of high-rate filtration on a commercial scale.

By means of daily analyses and tests, extending with some intermissions from October, 1895, to August, 1896, the various efficiencies of the filters were determined when the systems were operating under a variety of conditions, imposed on them principally by reason of the variations in the nature of the unfiltered water. As the result of these analyses, which were made while the systems were in the control of the companies which installed them, the Louisville Water Company found itself at the completion of the tests in possession of much valuable information and experience. Some important lines of inquiry had not, however, received the attention which they demanded. As a consequence, another series of investi-

gation of a supplementary nature was made independently by the Water Company. Some electrolytic methods of purification were also tested, but proved almost total failures. The complete investigations cover nearly two years.

The Louisville report on high-rate filtration is a most valuable addition to the meagre literature on the subject. No other inquiries of a similar nature have been so comprehensive or so carefully directed. The conclusions reached therein admit of more than local application. They indicate the lines along which must be sought improvements in the construction and operation of high-rate filtration systems, particularly when dealing with waters carrying large quantities of suspended matter.

It would be subversive of the object of this review to consider at all in detail the numerous physical, chemical and bacteriological analyses appearing in Fuller's report; the intention being to present only the important conclusions resulting from an analytical study of the data collected, and briefly such collateral matter as may be considered necessary for their understanding. These data, although secured largely for the purpose of comparison, were often not strictly comparable; while investigation along particular lines of inquiry, involving the question of a constant relation between two factors, failed to satisfactorily establish such relation, because it was found impossible to maintain constant conditions during the investigations. Some lines of inquiry were not prosecuted far enough to lead to practical conclusions, although they served to give prominence to principles already recognized.

In filtering a crude water which is subject to wide variations in its character, the filters can be operated with increasing economy as the nature and extent of these variations become known. This information is secured by physical, chemical and bacterial analyses, which should be made frequently and continuously for a long enough period to include all of the conditions which may have any value in determining the method of operating the system.

The most important points to be determined in a physical analysis are: color, odor, taste and temperature. A water which is not satisfactory in these respects is not acceptable, although it may be safe for domestic use.

In a chemical analysis it is important to determine:

1. The quantity and the nature of the suspended matter present in a water.

2. The extent to which are found certain chemical compounds which render the practice of coagulation practicable, notably the carbonates and bicarbonates of calcium and magnesium.

3. The amount of dissolved oxygen which is present—a matter of importance in the electrolytic formation of coagulum with iron electrodes.

4. The oxygen consumed, which is approximately proportional to the carbonaceous organic matter present.

5. The quantity of free ammonia present, resulting largely from the initial step in the decomposition of organic nitrogenous matter.

6. The amount of ammonia obtained from the nitrogenous matter by distillation with potassium permanganate, and recorded as albuminoid ammonia. The sum of the ammonias is considered a measure of the degree of organic contamination.

7. The amount of nitrites present, indicating an intermediate condition between the organic and the mineral state of the nitrogenous matter.

8. The amount of nitrates present, indicating the extent to which the organic nitrogen has been mineralized and thus rendered unobjectionable, and which, compared with the nitrates of the filtered water, shows the efficiency of the filters in promoting nitrification.

As illustrating the wide variation which may be found in the amount of chemical and organic impurities of a raw river water, the following data, relating to the Ohio River water at Louisville, is abstracted from Fuller's report:

	Maximum.	Minimum.	Average.
Suspended matter, parts per million	5311.	1.	225
Oxygen consumed, parts per million	65.	1.8	
Albuminoid ammonia, parts per million	4.900	0.076	
Alkalinity, parts per million	108.	21.	

In the Louisville investigations the usual bacterial analyses were made. The quantitative analyses of the raw and of the filtered water were necessary for the determination of the

bacterial efficiencies of the systems tested. The actual numbers of organisms which were found in the filtered water is a point which invites special attention, if great value is to be attached to the numerical limit set by the best European practice, *i. e.* 100 bacteria per cubic centimeter. This number was frequently exceeded at Louisville under conditions which cannot be called abnormal.

The qualitative bacterial analyses of the unfiltered water had for their object the detection of disease germs, and allied and associated organisms. The results were, as is usually the case, largely negative, though *B. Coli Communis* was found several times when the river was at low stages, and only once when high; showing, as would be expected, the greater effect of sewage contamination when the dilution was diminished, and condemning for domestic use the water in its raw state. *B. Typhosus* was not found at all.

The filtration systems installed at Louisville were operated by representatives of the several companies interested, and were under their control, but they modified their methods several times at the request of the Water Company. As these systems were tested, certain defects became apparent, most conspicuous of which were the absence of adequate provision for sedimentation and coagulation, and the crudeness of the devices for supplying chemicals to the water to effect coagulation, leading frequently in their use to a wasteful and even dangerous extent.

In both low and high-rate filtration the relief of the sand-beds from clogging material, secured by plain sedimentation, or sedimentation in connection with coagulation, has been generally recognized as a feature of the complete process meriting the fullest consideration. The economic limit of sedimentation is reached when, in providing for such treatment of the raw water, the total expense thereby involved is balanced by the economy secured to the complete process, this economy being determined by comparison with filtration without sedimentation. The practical determination of this economic limit depends upon knowing the factors embraced, and upon assigning to them proper values. It was found in the Louisville investigations impossible to determine closely

these values, even with the relatively large capacity of the sedimentation basins used in the final series of inquiries.

For the purpose of coagulation, sulphate of alumina proved more satisfactory than any other chemical which was used. As compared with potash alum it contained 60 per cent more available aluminum and cost about the same per pound. It was found that the use of ferrous iron could not be safely permitted on account of the appearance of the iron in the effluent, due to the solubility of the ferrous hydrate in the carbonic acid of the water. Ferric sulphate possessed the advantage of being slightly cheaper than sulphate of alumina and of containing about three times as much metal available for the formation of the coagulating hydrate, but it did not prove readily soluble in water.

Briefly stated, the reactions taking place in alkaline waters, when sulphate of alumina is added, are these: the carbonates and bicarbonates of calcium and magnesium decompose the sulphate of alumina, thus liberating the sulphuric acid, which combines with the lime and magnesia, forming neutral sulphates. The alumina forms with the water, aluminum hydrate, which is of a gelatinous nature and is the desired coagulant. The carbonic acid from the carbonates is to be found in the water in the free state.

The essential feature of all successful high-rate filters is the use of a coagulant deposited on the surface of the sand-bed for the purpose of entangling suspended matter, including bacteria. It was found by Fuller that it was possible to form this surface film so quickly and thoroughly that it was not necessary to waste the effluent to any great extent after cleaning the sand-bed. This waste for the Warren and for the Jewell systems, expressed in percentage of the applied water, did not usually exceed eight-tenths of one per cent.

In the early stages of the Louisville investigations, when there was but little data to serve as a guide, none of the systems was able to satisfactorily adjust the quantity of chemicals to meet the variable character of the raw water: nor was it possible later, with all of the data collected, to determine the optimum amount of chemicals for a given state of the water. The average use of sulphate of alumina for the first series of

investigations was about three grains per gallon of filtered water; the maximum was as high as twelve grains, and the minimum as low as half a grain. As the result of insufficient sedimentation and incomplete coagulation, the filters became quickly clogged when filtering ordinarily muddy water. The interval between the washing of sand-beds was as a consequence very short, and the quantity of filtered water used for washing correspondingly large, amounting in some instances, with one of the systems, to a greater quantity than it could filter. On an average, the filtered water used for washing was for the Warren, Jewell and Western Gravity systems, respectively, seven, five and one-third, and ten and three-quarters per cent of the applied water. The periods of washing were respectively six and seven-tenths, four and one-tenth, and six and four-tenths per cent of the period of operation. The average, maximum and minimum rates of filtration for the three systems were as follows:

	Million gallons per acre per day.		
Warren	120	155	80
Jewell	100	150	57
Western Gravity	96	152	33

From these variations in the rate of filtration it is evident that it would be necessary to install a large reserve area in order to maintain an uniform rate under all of the varying conditions of the unfiltered water. The important bearing which this feature has on the economy of filtration will subsequently be seen.

From the data obtained at Louisville the relation may be shown between the quantity of suspended matter in the raw water and the quantity of chemicals used. If this data is presented diagrammatically it will be seen that the two curves obtained are not parallel; still the high and the low points in the two agree fairly well. It was found that not only the quantity but the fineness of the suspended matter had a very important influence on the quantity of coagulant necessary, the greatest difficulty being encountered from the finely divided clay in the water, which occurred in the greatest quantities and most frequently in the late spring and summer.

This matter passed into the effluent even when the bacterial efficiency was high, thus indicating that the particles were smaller than the bacteria, and that coagulation had been incomplete. It was evident that the successful and economic operations of the systems depended upon the completeness of the coagulation of the water when applied to the sand-beds, more than upon any other one factor, not even excepting plain sedimentation.

The supplementary series of investigations which was made independently by the Water Company, and in the light of the valuable data already obtained, had for its object the determination of the practicability and economy of plain sedimentation; the determination of the value of certain chemicals in the treatment of the Ohio River water; the determination of the feasibility and cost of forming coagulants electrolytically by the decomposition of iron and aluminum electrodes; and the determination of the economic period of coagulation and the optimum amounts of chemicals required.

Three settling basins in connection with the Jewell filter were used in these investigations. The combined capacity of these basins was about 6000 cubic feet, being four times that provided in the Warren system, and seven times the capacity of the Jewell tank. These basins and the filter were connected in succession, and provision was made for the introduction of chemicals at the bottom of any of the basins. The unfiltered water passed upward to an overflow pipe in the side of the basin, thence downward to the bottom of the next, and continued to circulate in this way until it reached the filter: provision was also made for feeding the filter from the basins separately. It is seen that the period of coagulation could be varied by varying the point of application of the sulphate of alumina. It was important to determine whether the water which had received chemical treatment passed through the basins at the normal rate of displacement. Experiments showed that in the largest basin, having a capacity of 4000 cubic feet and requiring two hours and fifty-two minutes for its discharge at the normal rate of flow, the sulphate of alumina applied at the point of inflow appeared at the top in thirty-nine minutes and its maximum appearance

was in one hour and ten minutes. The other basins gave similar results, showing that the period of coagulation was variable, and less than the capacity of the tanks indicated.

Plain sedimentation, as occurring in one-gallon bottles, in which the water was in a quiescent state, progressed more quickly than in larger vessels in which the water was somewhat disturbed by flow. It was also found that the elevation of the temperature of the water created currents which retarded subsidence. Comparing the results obtained under the two conditions mentioned, it appears that about seventy-five per cent of the suspended matter was removed by quiescent subsidence in twenty-four hours, which was somewhat greater than that removed in forty-eight hours in the larger vessel. By extending these periods the percentage of suspended matter removed was very little increased, showing that the economic period had been reached. The water used was "fairly muddy normal water," containing about four hundred parts per million of suspended matter. For water containing finely divided clay in the quantities met with in the Ohio River in the late spring and summer, it was concluded that only about fifty per cent of it could be removed economically by plain quiescent subsidence. In reservoirs such as would be used in practice, subsidence would be much slower. The economic period could not be predicted from the experimental results obtained.

The advantages of sulphate of alumina as a coagulant have already been noticed. The objections to its use are the increase in the permanent hardness of the water and the increase in its corroding action. The first is due to the combination of the sulphuric acid of the sulphate of alumina with the carbonates of the water, which renders the water less desirable for boilers by increasing its incrusting property. The second is due to the liberation of carbonic acid from the carbonates. This acid attacks unprotected metal.

These undesirable changes in the water could be avoided by the formation of the hydrates or coagulant, by the electrolytic decomposition of metals. It was doubtful at the outset whether this process would prove economic when using aluminum, on account of its high cost, but the cheapness of the iron electrodes warranted the expectation that with their

use the electrolytic process would compare favorably with the use of sulphate of alumina; an expectation, however, which was not realized. The failure of the electrolytic method to economically furnish a coagulant was due to several intimately related conditions. It was found that the positive electrodes became covered with scales of aluminum or iron oxide, and the negative electrodes with silt and aluminum or iron, the metals being transferred from the positive electrode by reverse currents. The resistance to the electric current was thus in some instances increased as much as seven-fold, and at the same time there was a great reduction in the rate of formation of hydrates, by reason of the protection afforded by the coatings on the electrodes. The iron electrodes gave much better results than the aluminum, but the former required for their safe employment a sufficient quantity of free oxygen in the water to oxidize the partially soluble ferrous hydrate to insoluble ferric hydrate; otherwise iron would pass into the effluent. About fifty per cent of the metals was wasted in the form of oxide scale.

The effect of plain subsidence on a laboratory scale has already been noted. The results obtained subsequently with the large basins established several very important points with respect to this practice, particularly when it was aided by coagulation. With the water partially clarified by the removal of suspended matter, it was possible to operate the filters at a more uniform rate, thus obviating the expense of installing a large reserve filtering area. The removal of the suspended matter also effected an economy in the use of chemicals. It had been observed that the coarse particles sank to the bottom of the tank with the adhering aluminum hydrate before the finer matter had become thereby coagulated. When the bulk of the suspended matter was coarse, the treatment of the raw water by plain subsidence, and coagulation just preceding the application to the sand-bed, was satisfactory. When the suspended matter was fine, and particularly when of a clayey nature, it was necessary to afford more time for coagulation and an opportunity for subsidence before the water reached the sand-bed. The indications were that plain subsidence in connection with coagulation in the basins should

sufficiently improve the water to make it possible to obtain complete coagulation by a further addition of sulphate of alumina to the extent of from one and one-half to two grains per gallon.

It was also found that frequently some of the sulphate of alumina applied to the water was not available for the formation of coagulum, but was absorbed by the suspended matter. This loss by absorption was experimentally found to be about one-half grain per gallon for water containing about four hundred parts per million of suspended matter of variable size.

Closely associated with the question of the proper quantity of chemicals was that of the best means of applying them. So long as the character of the raw water remained constant it was possible to secure fair results automatically. It seemed, however, impossible to devise apparatus which could automatically adapt either the strength of the chemical solution or its rate of application to meet the variable character of the water. In all of the systems tested these devices were crude, particularly that in which a small stream of water was made to pass through a box containing solid sulphate of alumina or alum. The best results were obtained by varying the strength of the chemical solution in the mixing tanks and feeding by gravity. Careful supervision was necessary to avoid wastefulness, on the one hand, and on the other, incomplete coagulation, with a consequent inferiority in the effluent.

In those systems which did not employ a mechanical agitator in washing the sand-beds, the omission resulted in incomplete washing, and at times an excessive use of filtered water for that purpose.

Other defects, and common to all of the systems, were the lack of facilities of inspecting the interior of the filters, and the waste of the coagulated water lying on the sand-beds when the filters were washed, both of which it would be practicable to correct by slightly modifying the design of the filters. Very little inquiry was made with regard to the effect of thickness of the sand-beds or the size of grain. In the Warren, Jewell and Western Gravity systems, tested, the beds were respectively, 27, 30.5 and 31 inches thick, and the

effective size of grain, respectively, 0.51, 0.43 and 0.43 millimetres in diameter. From the poor effluents occasionally obtained when the maximum heads on the filters were approached, or following surface agitation with the rakes, it was apparent that the resistance to flow was too small. An effective size of 0.35 millimetres, and a bed thickness of 30 inches, it was thought would increase the frictional resistance sufficiently to secure at such times a satisfactory effluent.

The success of a filtration system is to be judged by the nature and quantity of the impurities found in the effluent which it furnishes, and by the cost of obtaining such effluent. There is no absolute standard of purity to which a potable water must conform; there is, however, an approximate standard which has been established by the general practice of slow filtration. It does not appear that in the final results obtained at Louisville there was any departure from this latter standard which may be considered of sufficient importance to merit adverse criticism. The permanent hardness of the water was increased by the use of sulphate of alumina, but even then the effluent was not any more objectionable in this respect than many other waters used in the West.

The number of bacteria in the effluent usually exceeded the limit for slow-rate filters, being frequently 200 or 300 per cubic centimetre. This limit, however, has been established more because it was found that it could be attained than because it was imperative that it should be attained. Organic matter was removed from the raw water to the extent of from 65 to 85 per cent, that which remained being largely the nitrogenous matter represented by the albuminoid ammonia in solution. It is important to note here that the nitrates in the effluent rarely exceeded those in the raw water, indicating that little or no nitrification had taken place as the result of filtration. In this respect there is an essential difference between the low and the high-rate systems of water filtration. In the former sufficient time is permitted for the process of nitrification, but in the latter this time factor must of necessity be subordinated to the attainment of a high rate.

The slow filtration system did not give satisfactory results in the investigations made by the City Engineer of Louisville

in 1885, because the finely divided clay in suspension in the raw water penetrated the body of the sand, from which it could not be removed by any method which would not have rendered the filters incapable of supplying an acceptable effluent. With the high-rate filters very little of this fine clay entered the sand-bed if coagulation was complete, and the beds could be completely washed, and with facility, by the use of a mechanical agitator in connection with a reverse current of water.

A feature of high-rate filtration which will be closely scrutinized is the use of chemicals which may, from a hygienic point of view, render the effluent undesirable. There is evidence that considerable judgment and care must be exercised in using sulphate of alumina, or similar compounds, to prevent their passage into the effluent in an undecomposed state; and naturally some apprehension will be felt when these are used in quantities averaging 1.75 grains per gallon, with a maximum use of 6 or 7 grains. Unfortunately there is not yet any statistical matter available either for or against this feature of high-rate filtration.

Fuller's final conclusions respecting the filtration of Louisville's water supply are as follows:

"The general method of subsidence, coagulation and filtration is applicable to the satisfactory purification of the Ohio River water at Louisville; but, as practiced by the Warren, Jewell and Western systems during these tests, its practicability is very questionable, if not inadmissible. By removing the bulk of the suspended matter from the water, large reductions could be made in the size of filter plant, amount of coagulant and cost of operation. On the basis of 25,000,000 gallons daily, the reduction when capitalized at 5 per cent would represent about \$700,000. There is no room for doubt but that for a less sum than this satisfactory provision for subsidence as outlined herein could be provided, which would not only aid in furnishing a filtered water of better quality, but would also give the water consumers a better service in other regards."

ABSTRACTS OF RECENT PAPERS.

The Probable Date and Source of the Eighth Satire of Canitz.

C. WILLIAM PRETTYMAN.

[Read before the Germanic Association, December 7, 1898.]

It is customary in the histories of Literature to dispose of the Satires of Canitz by calling them imitations of Boileau.

While granting the correctness of this statement in general, the writer attempted to show that Canitz received the inspiration for his best satire, *Der Hof*, from a poem of his German contemporary. Hofmann von Hofmannswaldau, entitled *Die Welt*.

Before discussing the question of source, however, an attempt was made to fix the date of Canitz's poem. To do this a letter was cited, written by the poet to his friend Zapfe, in which we find sentiments expressed corresponding exactly to those of the poem. This letter bears the date of September 15, 1690. In the lack of any positive evidence, this year was suggested as the probable date of the Canitz satire. The two poems were then read and in conclusion a comparison was made between them. In this comparison three points were discussed. First, the theme of the poems is the same. Second, the titles are practically identical, for an examination of Hofmann's poem reveals the fact that he was not treating of the world in general but of that world which he knew, namely, the court. Third, there are many striking coincidences in words and figures which could not have been accidental.

Dionysus ἐν Λίμναις.

WILLIAM N. BATES.

[Read before the Language Union, February 2, 1899.]

The paper opened with a brief discussion of the Dionysus festivals at Athens in general, and more particularly those of the Lenæa and the Anthesteria. These were shown to be two distinct festivals coming in different months, the Lenæa in Gamelion (once called Lenæon) and the Anthesteria in Anthesterion. The Lenæa were held at the Lenæon, a temple which must have been located near the market-place; the Anthesteria at the temple of Dionysus ἐν Λίμναις. An attempt was then made to find the site of these two temples. Three Dionysus temples have been uncovered in Athens, two south of the theatre and one west of the Acropolis. One of those south of the theatre has been identified by a passage in Pausanias as the temple of Dionysus Eleuthereus. This temple cannot have been the temple ἐν Λίμναις for four reasons. 1. If it were, the temple would have two names, which is unlikely. 2. The temple of Dionysus Eleuthereus was opened on fixed days, whereas the temple ἐν Λίμναις was open on only one day in the year. 3. Dionysus Eleu-

thereus was closely connected with the later festival known as the Great Dionysia, while the Anthesteria, one of the older festivals, was celebrated at the temple *ἐν Λίμναις*. 4. The temple near the theatre lies on a rock foundation, and there seems to be no possibility of a marsh anywhere near it. The temple *ἐν Λίμναις*, as its name tells us and as a passage in *The Frogs* implies, was at least situated in low ground. This last argument applies equally well to the second temple south of the theatre, a temple which is farther excluded by its date. The use of breccia in its foundations shows that it was built after the age of Pericles, perhaps about 420 B. C. The temple *ἐν Λίμναις*, on the other hand, is known to have been a much earlier building. The temple found by Dörpfeld west of the Acropolis is to be identified as the Lenæon. That is clear from its location and from the finding of a large stone wine-press (*ληνός*) in the sacred precinct and of other smaller ones outside of it. This cannot be the temple *ἐν Λίμναις*, however. 1. Because it does not agree with a statement of Thucydides (II, 15), which puts that building south of the Acropolis. 2. This cannot have been a marshy spot in antiquity. The conclusion arrived at in the paper was that the temple of Dionysus *ἐν Λίμναις* has not yet been discovered; that its site must be looked for south of the Acropolis, perhaps about one hundred yards south of the military hospital, near the line of the steam-tram to Phalerum.

The Syntax of the Noun in the Milstat Version of the Vienna Genesis.

C. WILLIAM PRETTYMAN.

[Read before the Language Union, February 2, 1899.]

The paper as presented to the Union was a brief outline of a much larger study. Its purpose was to show the method pursued in the investigation and to give a few characteristic results, rather than to enter into minute detail.

A short introduction was first read, including a brief sketch of the period to which the poem belongs, viz.: the transitional period from Old High to Middle High German; and a short sketch of the contents of the poem itself.

Ever since its first partial publication by Graff in 1829 till the present time, the Genesis has engaged the attention of scholars, and its prime importance has been recognized by all. Scherer, who in Q. F. I. proved the Genesis to be not a homogeneous production, but the work of six different poets, promised as a further step in his investigation a study of the syntax, but this promise he never fulfilled. Such a study was the writer's object in the paper presented. It was undertaken in the hope of making a contribution to the grammar of this period of the German language.

In the work itself the cases were taken up in the following order: Nominative, Vocative, Genitive, Dative, Accusative. The constructions under each case were treated in sections.

The writer next selected several characteristic paragraphs, illustrating the results obtained in the investigation. The following may be given here:

In the use of the prepositions "in" and "auf" with the dative we have several interesting constructions. As a rule these prepositions are used as in N. H. G., viz., with the accusative to express motion, with the dative to express rest or motion within a specified place. There are, however, in the Genesis three cases where we have these prepositions used with the dative to express motion, where the regular M. H. G. construction would require the accusative. (cf. Grimm, Grammar 811—with verbs "legen" and "setzen.")

1. "in" with "legen."

"unde sinen schaz vorne leget in dem chorne."

Diemer II. 42 ascribes this to the carelessness of the scribe, and emends the text "unde sinen sieberchopf purge in des jungesten chorne unde sinen schaz vorne in dem sine chorne."

First let the other examples be examined.

2. "auf" with "legen" and "setzen."

105.36 "Joseph nam groz wudir warumbe sin vater widir ein andir dwirhet (quer über ein ander legen) sine hende ouf beden sinen chinden."

In the glossary Diemer expresses surprise at the dative used here.

3. The other case concerning which there can be no doubt, for it is found in the original version, seems to have escaped Diemer entirely.

1.27 "dar zuo wie ich den stuol miu setzen norden halp sin ouf dem hohem himele = W 11, 26 uf dem himele.

The dative may be allowed to remain in all these cases. If it be remembered that O. H. G. used regularly either the dative or accusative with these verbs, a survival of the use in a monument of this transitional period need not cause surprise. An examination of the other poems of this group from this point of view might yield interesting results.

The paper concluded with a discussion of Scherer's theory of authorship as tested by a study of the syntax. The conclusion reached was that confirmatory evidence was found only for his sixth poet, the poet of Joseph in Egypt.

Die Chemischen Grundlagen der Lehre von der Giftwirkung und Disinfection.*

MARY ENGLE PENNINGTON.

[Read before the Weekly Conference in the Laboratory of Hygiene, Jan. 26, 1899.]

By applying physico-chemical laws and methods of research to bacteriology Krönig and Paul have obtained results of interest not only to the scientist but to the practitioner also. These workers have brought to the

* B. Kronig and Th. Paul, Zeitschrift für Hygiene und Infectious Krankheiten, Band 25, Heft 1.

problem of disinfection the laws of electrolytic dissociation, and by their aid have thrown yet more light upon this important question.

We have long been familiar with the gas laws of Boyle-Mariotte, Gay-Lussac and Avagadro, namely that:

1. Under the influence of decreased or increased pressure the decrease or increase in volume is the same for equal volumes of all gases.
2. That an increase or decrease in temperature is followed by an equal increase or decrease in equal volumes of all gases.
3. That equal volumes of all gases at like temperature and pressure contain an equal number of molecules.

It was not, however, until about 1885 that van 't Hoff, studying the work done by Pfeffer in 1877, pointed out that most interesting generalizations might be drawn from osmotic phenomena leading to the formulation of a series of laws for solutions closely following those accepted for gases. He found that the osmotic pressure of solutions obeys the laws stated by Boyle and Mariotte for gas pressure, and that the temperature coefficient for osmotic pressure is 0.00367, or the same as that found by Gay-Lussac for gases. It has also been observed that Avagadro's law is applicable to solutions, and van 't Hoff states that "is-osmotic solutions contain the same number of molecules of the dissolved substance in the same volumes at the same temperature, and this number is the same that would be contained in the same volume of an ideal gas at the same temperature and pressure."

Continuing his work, van 't Hoff pointed out that the above laws held good for non-electrolytes only; that electrolytes showed a much greater osmotic pressure than that calculated according to the laws of gases. To explain this variation, Arrhenius, in 1887, advanced his theory of *electrolytic dissociation* which has grown to be a great factor in the study of solutions. Arrhenius studied the depression of the freezing point and found that electrolytes gave too great a depression to agree with the laws of van 't Hoff. The osmotic pressure was also excessive, and such solutions were able to conduct a current of electricity.

The accepted laws governing gases met at first exception after exception, each of which when investigated left the law only the more firmly fixed. Since the laws of osmotic pressure are so closely allied to the laws of gases, one naturally considers the unexplained variations of the one in the light of the explained variations in the other. According to the knowledge gained in the investigation of gases, the above discrepancies in the behavior of solutions should be accounted for by the assumption that we are dealing with dissociated molecules. That in solutions showing high osmotic pressure and electrical conductivity, we have more discrete particles than the molecules of the dissolved substance represent.

If in a solution of common salt (NaCl) the molecules are dissociated into ions of sodium and ions of chlorine we have, then, just twice as many individual particles in that solution as when sodium and chlorine are united. A current acting upon such a solution upsets the perfect balance of the electrically charged ions, and the result is a "migration" of those

positively charged to the negative pole and of those negatively charged to the positive pole.

When an electric current is passed through a solution of hydrochloric acid in water the hydrogen of the acid travels over to the negative pole and is termed a "Kation," while the chlorine goes to the positive pole and is called an "Anion." From such behavior we must infer that hydrochloric acid has been dissociated by the action of water into two kinds of particles, one negatively, the other positively charged with electricity. Then, of course, gaseous hydrochloric acid must be regarded as strictly neutral toward the current, which has been actually demonstrated by showing that the dry gas does not conduct the current. In such a solution of hydrochloric acid we find the theoretical osmotic pressure about doubled. Therefore we have an almost complete dissociation of hydrochloric acid into its ions and we have also twice as many discrete particles as would exist if only the molecules of hydrochloric acid were present.

If we determine the osmotic pressure of sulphuric acid in water we find the theoretical quantity about trebled, which means simply that sulphuric acid (H_2SO_4) in solution forms $\overset{+}{\text{H}} + \overset{+}{\text{H}} + \overset{-}{\text{SO}_4}$.

Bases, such as potassium or sodium hydroxides, dissociate into a metallic ion and an hydroxyl (O H) ion, the latter being the anion.

Considering solutions in this light we see that the properties of any dissolved electrolyte must be the sum of the properties of its ions, provided that complete dissociation has taken place. However, such a simple state of affairs is not present except in very dilute solutions, and we have in reality to deal with the ions and the undissociated molecules. We cannot yet say that chemical reactions occur only through the interaction of ions, since non-electrolytes do react chemically, yet the greater number of reactions occur among dissociated molecules.

Solutions which contain an equal number of molecules in a given volume exert an equal osmotic pressure. This fact has been confirmed by a number of investigators, notably De Vries, who studied plasmolysis in living cells. Such solutions, possessing an equivalence in osmotic pressure, have been termed "is-osmotic," or "iso-tonic," and can be obtained by dissolving the molecular quantities expressed in grams in equal volumes of the solvent.

Of course the question of osmosis must enter into the problem of disinfection, since bacteria are cells enclosed by a living membrane upon which the toxic agent must act, or through which it must penetrate, in order to destroy the cell's activity; and as osmotic pressure is so largely dependent upon the electrical nature of the compound, Krönig and Paul have prepared solutions which contain equal numbers of molecules in equal volumes and have compared the action of such solutions on bacteria. All the solutions used were prepared by dissolving the molecular weight of the reagent expressed in grams in a definite quantity of water. Hence the action of an equal number of molecules is obtained.

The tests were made upon the *Bacillus anthracis*, though the *Staphylococcus pyogenes aureus* was also used, the latter being much the weaker

organism. So far as possible the spores were employed. All experiments were compared with the action of a solution of mercuric chloride containing 271 grams of the salt in 16 litres of water. The number of colonies developing after treatment with the above solution was compared with the number developing after treating with the substance to be tested.

The first series of experiments was made upon the metallic ions of the mercuric salts. Certain mercury compounds dissociate more completely than others, hence the relative action of such salts was compared with those which do not dissociate so well. Then the degree of dissociation was decreased gradually and comparative observations made.

The halogen salts of mercury, the cyanide and the sulphocyanide dissociate in the following order beginning with the maximum: Mercuric chloride, mercuric bromide, mercuric sulphocyanide, mercuric iodide and mercuric cyanide. If the disinfecting action depends upon the presence of ions in the solution, then the activity of these solutions should decrease with decreasing dissociation. This was shown by actual experiment to be the case, since a mercuric cyanide solution, though four times as strong as a mercuric chloride solution, was yet much weaker in its action, allowing in one case thirty-three colonies to develop while the chloride entirely prevented development. In every case the degree of dissociation determined the disinfecting activity. Mercury formamide, which dissociates but slightly, has very little action.

The behavior of the soluble compounds of silver was analogous to that found for mercury. Silver nitrate, dissociating the most completely, was also the most active disinfecting agent, silver perchlorate standing next in activity. Silver cyanide, which dissociates scarcely at all, was harmless in a concentration of eight litres. Even the *Staphylococcus pyogenes aureus* was unaffected by it.

If the strong disinfecting action above outlined is in reality due to dissociation and the concentration of metal ions rather than to the mere presence of the salts themselves, it follows that any decrease in the number of free ions must result in a decrease in the disinfecting power of the solution. If another body containing the same acid ion as that already in solution be added to the first a reduction in the concentration of the metallic ions takes place. In other words the second salt added prevents the dissociation of the first to a greater or less extent. Accordingly sodium chloride was added to mercuric chloride, when a decrease in activity was at once seen. Potassium chloride and hydrochloric acid acted analogously. This observation is of great practical interest since some corrosive sublimate tablets which are on the German market, at least, contain sufficient salt to render them decidedly inefficient.

Theoretically mercurous salts should dissociate more completely and hence disinfect more thoroughly than mercuric. Unfortunately the dissociation of such salts has not been well studied, and the results obtained from the bacteriological investigation would indicate that the mercurous compounds are not as active as the higher series.

Copper sulphate, following its dissociation figure, is less active than

copper bromide and chloride; cupra ammonium sulphate, having complex ions and very few available copper ions, acts only slightly upon the organisms.

Various lead, nickel, cobalt, chromium, cadmium, barium and zinc salts were tried, but none varied from the usual course.

A study of the action of thirteen of our more common acids when in aqueous solution brought out the interesting observations that hydrofluoric acid is the most effective, while hydrocyanic acid is the least. Sulphuric acid stands ninth in the list, and is directly preceded by hydrofluosilicic acid. Oxalic acid is more effective than hydrochloric. In each acid the degree of activity follows the degree of dissociation. Apparently, then, the toxic action depends upon the hydrogen ions which are liberated.

When bases dissociate we have hydroxyl ions. These are toxic but less so than are the hydrogen ions of the acids. Both *Anthrax* and *Staphylococcus* resisted the action of the bases much better than that of the acids.

All the halogens in aqueous solution are good germicides, chlorine being the most active. These investigators consider that chlorine, particularly when nascent, is the best disinfectant available and recommend it for cleansing the skin of the hands and arms of surgeons. They use and advise a solution of one per cent potassium permanganate and 0.5 per cent hydrochloric acid. From such a mixture free chlorine is liberated. The permanganate of course colors the skin brown but this stain is readily removed by sodium sulphite or oxalic acid.

Substances which are strong oxidizers chemically are in general but poor disinfectants. Persulphuric acid was found to be fairly active, but permanganic acid was weak. Hydrogen peroxide in 3 per cent solution showed a decided activity, only six colonies appearing in one instance after an action on the organism of sixty minutes duration.

Among the organic compounds a number of trade preparations were tested. The chief result being to prove their inefficiency.

Phenol appears to act by its undissociated molecule, since its dissociation in water is very slight. A 5 per cent solution in water was far more active than a 90 per cent solution, but a 4 per cent solution showed double the number of developing organisms when compared with a 5 per cent solution of the same body. The addition of sodium chloride to a 4 per cent phenol solution showed a decided increase in germicidal properties.

Alcohols and acetone when used as solvents entirely check the action of certain disinfectants and lower others very considerably. Metallic compounds when dissolved in strong alcohol lose all their toxicity, while phenol and formaldehyde are greatly reduced. This fact was noted years ago by Koch who was at a loss to account for it. If, however, we accept the degree of dissociation as a condition upon which disinfection depends the matter becomes clear because alcohol and acetone practically prevent the ionization of substances dissolved by them.

The choice of test objects, apparatus, methods of procedure and the like, for the carrying out of this research were each and all considered

with great care. An equality of resistance was given the organisms by growing them upon similiar media and in so far as possible having a like descent for each culture. Temperature, light and favorable media were submitted to careful study and those conditions chosen which conferred the greatest power of resistance.

The spores were suspended in water and the liquid allowed to cover small, rough garnets contained in suitable vessels. When subsidence had occurred the supernatant liquid was drawn off and the garnets dried at low temperatures. The dry organisms were then treated with the disinfecting fluid for the required length of time, such fluids being also siphoned off.

Simple washing with water will not remove the disinfecting agent quickly enough nor completely enough from its field of action, neither will it prevent further action of the toxic substance which has already penetrated the cell wall. In order to produce a prompt cessation of such activity chemical agents which neutralized the germicidal substance were added. Such agents were for the metallic salts hydrogen sulphide or ammonium sulphide, for the acids weak bases, for the halogens ammonium hydroxide, for permanganate hydrogen peroxide, etc., etc. Of course great care was exercised that these neutralizing agents were not added in excess.

After acting upon the organisms with the disinfecting substance, neutralizing and washing, the garnets were shaken up with pure water, and from the suspension so obtained cultures were made and the developing organisms counted.

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* Beginning with New Series, No. 1. (Old Volume V, No. 13.)

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and the Courses for Teachers, are in like manner restricted as to their contents. The Fasciculi and College Circulars are published separately after the University Catalogue, of which they are, to a large extent, reprints. Single copies are mailed free upon request.

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ANNOUNCEMENT.

The Editorial Committee takes pleasure in announcing that the Quarterly Bulletin of the Free Museum of Science and Art of this University has been merged with the UNIVERSITY BULLETIN. All scientific papers which, under the old plan, would have appeared in the Museum Bulletin, will henceforth find place from time to time in the UNIVERSITY BULLETIN. The first article to be published under the new arrangement is that on "The Rittenhouse Orrery" in this issue.

In effecting this merger, the Editorial Committee has acted with the sole aim of raising the standard of the UNIVERSITY BULLETIN, and of enlarging its sphere of usefulness and scientific interest. The high character of the papers hitherto published in the Museum Bulletin is sufficient guarantee that the consolidation will add a factor of value to the contributions of the University to the general cause of education.

PROCEEDINGS OF THE CORPORATION.

At a postponed meeting, held on Thursday, April 13, the following business was transacted :

Certain nominations to Fellowships and Scholarships, made by the Faculty of Philosophy for the year 1899-1900, were duly confirmed.* The resignation of John Quincy

* These will be published in the June (Commencement) issue of the BULLETIN.

Adams, Ph. D., Assistant Professor of Political Science, was received and accepted with regret. Audits of the Treasurer's accounts, and of the accounts of the Heat and Light Station, were presented and accepted. Acceptance of designation of bequest by Mrs. J. B. Lippincott was made, and thanks were voted to the Lippincott family for their continued liberality. It was ordered that professors of clinical medicine be authorized to examine for degrees, but that they should not have seats in the Medical Faculty. Subscription for five years was made toward the support of the American School at Rome, through private contributions. Thanks were voted to donors of funds; to Dr. J. Dutton Steele, for historical apparatus; to Mrs. David Wallerstein, for Agnew MSS.; to Dr. H. D. Vail, sometime Professor of Mathematics at Haverford College, for a collection of climatological reports; to Mr. Allen Childs, for two addresses delivered by Dr. William H. DeLancey, sometime Provost of the University, in 1828 and 1830, respectively; to the *Dental Cosmos*, and to Drs. Guy Hinsdale, W. W. Keen, H. C. Wood and C. A. Oliver, for books; and to Mrs. Thomas H. Clay, for a unique set of silhouette "negatives" of the members of the Class of 1811.

At a special meeting, held on Friday, April 21, the following business was transacted:

Announcement was made of the gift of \$25,000, toward the fund for the completion of the new Law School building, by the families of the late Eli Kirk and John Sergeant Price. It was ordered that one of the halls in the new building be given the name of "Price Hall." Announcement was also made of the gift of a similar sum of \$25,000, for a similar purpose, by the friends of the late Richard C. McMurtrie. It was ordered that a hall in the new building should bear the name of "McMurtrie Hall."

SOME PHASES OF THE ASTRONOMY OF TO-DAY.

Charles L. Doolittle.

[An address delivered before the Pennsylvania Chapter of the Phi Beta Kappa Society, Thursday, April 13, 1899.]

Something more than fifty years ago, Ormsby MacKnight Mitchell, a brilliant and popular speaker, awakened for the first time on this side of the Atlantic a general interest in astronomy. Two or three small observatories were then in existence where something was done in a modest way, but of their work the outside public apparently knew or cared but little.

President John Quincy Adams had appealed in vain to Congress urging the erection of a national observatory. His repeated allusion to the subject, with his favorite designation of an observatory as a "watch tower of the skies," seems to have produced nothing more substantial than ridicule.

The magic of Professor Mitchell's eloquence, however, succeeded where President Adams' appeals to Congress had failed. Money was raised by subscription for the purchase of an eleven-and-a-half-inch glass (at that time considered a magnificent instrument) and for mounting it in an appropriate building; even day laborers subscribing for a few dollars' worth of stock, and working out the subscription by carrying hods or excavating in connection with the work of construction. Thus was inaugurated the Cincinnati Observatory, if not the first in this country, certainly one of the earliest which has survived to the present day.

Soon after was founded the National Observatory, though in order to obtain recognition this enterprise was compelled to appear under an assumed name; and so it was that a plan for a depot of charts and instruments succeeded, where the same plan had failed when named an observatory.

During the same decade the Harvard College Observatory was established; and thus our science was fairly launched upon a career which was soon distinguished by

the appearance of numbers of our countrymen in the front ranks of the world's astronomers.

It has been said that Professor Mitchell's program was a very simple one, viz., to procure the largest possible telescope, and then proceed to make original discoveries. As a result of casual talks with great numbers of people, I am convinced that this view of the work of an astronomer is a very common one. The essential thing is the big telescope: the original discoveries should follow as a matter of course.

We have become so accustomed to newspaper accounts of the discovery of new celestial objects, of new facts bearing on the ever-recurring question as to the physical condition of the other planets of our system, together with schemes for opening communication with their hypothetical inhabitants, that it is not surprising if these matters are popularly supposed to absorb the entire attention of the professional astronomer; and although they do find a place in the general scheme, they are by no means the only or most important objects of investigation.

The mere discovery of one more new object, if it leads to nothing further, is of little importance. Our knowledge is extended by studying and disentangling the complex laws by which the bodies of the universe are governed, and those which give us a clue to their past history and future destiny. All work of any value in this direction rests upon a vast substratum of data, which can only be accumulated by patient routine work not of a kind to attract outside attention.

It is upon some of these less conspicuous labors of the professional astronomer that I shall speak for a short time this evening.

In the first place, all exact knowledge of the plan of the universe rests upon precise measurements of the positions of the heavenly bodies. In every well-equipped observatory, besides the large telescope, there will be found one or

more less imposing instruments which usually attract but little attention, designed for the above-mentioned purpose.

It is with these instruments, and with the tedious mathematical computations involved in reducing the observations made with them, that the major part of the force of many observatories is engaged.

Recently there was issued from the government press at Washington a modest volume of something more than three hundred pages, bearing the title: "The Second Washington Catalogue of Stars, prepared under the direction of J. R. Eastman." The preface by Professor Harkness, the scientific director of the observatory, begins as follows: "The following catalogue of stars from all the observations made with the 8.5-inch Transit Circle of the Old Naval Observatory has absorbed the labors of about two-thirds of the observatory staff for more than thirty years." This catalogue gives the positions of 5,151 stars based upon 72,914 individual determinations, all involving a vast amount of detail in computation and discussion such as can hardly be appreciated by any one not a professional astronomer. Yet what part of the newspaper space which in the course of these thirty years has been filled with accounts of the activity, or want of activity, of this institution, together with the petty jealousies of some members of the staff, the quarrels and intrigues over its management, has been devoted to this, the real work of the observatory during all this time?

Let us examine a little more in detail this one line of research, that of cataloguing the stars. When the first such catalogue of any completeness was attempted it appears to have been looked upon as a task appalling in its magnitude. To attempt to fix the position of each individual of this countless heavenly host was bewildering in its mere suggestion. Yet like many another task it appeared greater in the contemplation than it was in reality. We read that the word of the Lord came unto Abraham saying, "Look

now toward heaven, and tell the stars if thou be able to number them; and He said unto him, so shall thy seed be." Yet Hipparchus, as the result of the labor of a year or two, not only numbered, but determined the position of all these stars which were bright enough to be clearly seen in those pre-telescopic times. Very likely he was himself surprised to find that he had enrolled only 1,080 individuals.

True, three times as many faint stars could be seen when the conditions were favorable, but we may safely fix 5,000 as the outside limit to the number which could even be seen from those latitudes; and not one-half this number were ever visible at the same time.

The telescope has extended our knowledge enormously in this direction, but if the stars visible in the giant telescopes of to-day were for sale at one dollar each, more than one of our fellow-citizens could find the wherewithal to purchase the entire lot. Probably something less than \$100,000,000 would be required; a mere bagatelle in comparison with the prospective cost of obtaining possession of our recent legacy from Spain.

Though one hundred million does not constitute a countless host, yet it is a very respectable number. The work of determining the positions of the brighter members of the system with an accuracy commensurate with the ever increasing severity of the demand, has always consumed a large part of the energy of the profession.

More might have been accomplished if a practicable system of co-operation had been devised; until a few years ago, however, every observer worked independently of every other.

When in 1844 Lieutenant Maury took charge of the newly erected National Observatory, he evolved a very ambitious program for that institution. One piece of work he described as follows: "A regular and systematic exploration of the whole heavens from 45° south has been commenced, with the intention of penetrating with the

telescope every point of space from that parallel of declination up to the North Pole, and of assigning position to every star down to the tenth magnitude that shall pass through the field of view." This was a monumental instance of zeal not according to knowledge.

We cannot state the precise number of stars which the proposed catalogue would have contained, but it would certainly have exceeded half a million; and had there been sufficient fixity of purpose and persistency in the management of the institution to insure the devotion of its entire force to this one undertaking, a hundred years would hardly have sufficed for its completion. As a matter of fact, it was followed up for a time in a desultory fashion, and then abandoned. Unlike many another government undertaking, if no good was accomplished, it resulted in no great harm.

A quarter of a century later a plan for cataloguing about one-fourth of the stars embraced in Maury's scheme was perfected, and the work is now approaching completion. For this purpose the celestial sphere was divided into zones of about five degrees in width, and each of the following observatories undertook the responsibility of one or two of these zones: Kasan, Dorpat, Christiana, Helsingfors, Gotha, Cambridge (England), Cambridge (United States), Bonn, Lund, Leiden, Berlin, Leipzig, Albany, Nicolaëff and Washington, one zone instead of the entire heavens; and it is unlikely that we shall have the results of this modest fraction earlier than five years from the present time.

Since the organization of this undertaking, the art of photography has been so far perfected that it can be advantageously employed for the purpose of mapping out the heavens. The position of a star may be determined by measuring a photographic plate; not, indeed, with the high degree of precision of direct observation, but with an accuracy sufficient for very many purposes.

In the spring of 1887, an international conference assembled at Paris for the purpose of perfecting plans for a photographic chart of the entire heavens. The scheme adopted provides for two sets of plates, one of long exposure—about one hour—with the view of obtaining images of all stars down to the thirteenth magnitude. In case of the second set, the exposure will be from twenty to thirty minutes, the object being to form a catalogue of stars of the eleventh magnitude and brighter. If ever completed, this catalogue will give the positions of three million stars. Eighteen observatories in all parts of the world, except, alas, the United States, are co-operating in this great undertaking. It is impossible even to guess what time will be required for its completion.

The application of photography does not dispense with direct observation, as it will be necessary for the purpose of orienting the plates that each shall contain one or two stars so determined. This alone calls for a catalogue of sixty thousand stars—a great work in itself. Of course, existing material may be utilized, but it is desirable to have all stars re-observed according to a uniform homogeneous system.

Devout individuals in the past have undergone the labor of counting the number of verses, words and letters contained in the Holy Scriptures, of determining the middle verse, the middle word and the middle letter, and a variety of similar matters. Now, doubtless many look upon this line of investigation as being of about the same order of importance as that of which we have been speaking. What is to be done with a catalogue of stars, unless it be to place it on exhibition as a monument of misdirected industry?

It is said that Hipparchus was led to construct his stellar catalogue by the appearance of a star where previously there had been none. He suspected from this circumstance that the heavens, instead of remaining ever the

same, are subject to important changes, new stars appearing and old ones disappearing. As a step toward the solution of this question he adopted the true scientific course, namely, that of preparing an accurate representation of the heavens as they then were, in order that future comparison might show whether any change had taken place. We now know that the suspicions of Hipparchus were well founded. Every star and planet of which we have any definite knowledge is in rapid motion. Many of them show evidence of important physical changes. New stars occasionally appear, usually only to disappear soon after. Most of these changes can only be detected by a comparison of observations separated by a considerable interval of time. For their investigation we need accurate records of the past condition of the heavens for comparison with that of to-day. Very many glimpses are thus obtained of phenomena whose complete unfolding can only be witnessed in the remote future.

Thus it is that our census of the heavenly hosts must be repeated from time to time with all possible care and minute attention to detail: that no one investigation can be regarded as completed, and the account closed for all time.

It has been remarked that formerly an investigator in physical science was satisfied with a result which came within one-tenth, or one one-hundredth of one per cent, of what he conceived to be the truth, attributing the small discrepancy to error of one kind or another; but that now it is precisely these small residuals which receive the most careful and painstaking attention, and that it is to their study we are indebted for the progress of science in recent times. It was in this way that Le Verrier and Adams proved the existence of Neptune before it had been recognized in the telescope; that companion stars were known to accompany Sirius and Procyon in their journeyings through space, years before their existence had been visually demonstrated;

that within the last ten years the variations of terrestrial latitude, for which astronomers have been searching since the time of Euler, have been shown to have a real existence.

Ever since the telescope was first seriously directed to the stars, it has been known that in many cases those which appeared single to the naked eye were shown to be double. This apparently excited but little interest, it being supposed merely a case of two stars which happened to be in the same line of vision. About a hundred years ago, however, Sir William Herschel conceived the idea of measuring the relative positions of these objects, with the view of thus obtaining some notion of their relative distances. Thus he supposed that by making such measurements at intervals of six months, when the earth was in opposite parts of its orbit, the nearer of the two would show slight displacement with respect to the more remote. Upon comparing his measurements made according to this plan, extending over a number of years, he was surprised to find a kind of motion which no one appears ever to have suspected. He found that the one star revolved about the other as the earth about the sun, thus showing that the stars, in some cases at least, are the centres of systems like our own. Herschel remarked that his experience was like that of Saul, son of Kish, who went out to seek his father's asses and found a kingdom.

Since the time of Herschel much attention has been given to this class of bodies. More than ten thousand have been discovered and catalogued, and the field is by no means exhausted. The work of measuring their relative positions and computing their orbits occupies a prominent place in the programme of many observatories. As might be supposed, we find very great variety in these systems. Some complete their circuits in a few days, or even a few hours, as has been suspected in a few cases, while others require hundreds or thousands of years; thus many

generations must co-operate to this end before the motions of these latter are fully known.

The measurements on which this class of investigations rest are among the most delicate and difficult which the astronomer is called upon to undertake. It is here that the giant telescope, with its great magnifying power, is in demand; the best atmospheric conditions, such as we rarely find in these regions, are also very important. In attempting to measure the closest and most difficult objects, it is a common experience to be compelled to wait for weeks or even months before a favorable opportunity presents itself.

Hevelius, a distinguished astronomer of the seventeenth century, who devoted a long life and an ample fortune to the service of science, used to employ watchmen, whose duty it was to constantly scan the heavens and at once report anything likely to prove of special interest. In adopting this idea, we should be surprised if modern science had not been able to improve upon the method: thus, at the Harvard College Observatory, a series of photographic plates take the place of the living watchman. These plates overlook nothing through inattention, nor do they forget what has been entrusted to their keeping—considerations of vital importance.

After examination, these records, duly numbered and indexed, are filed away for possible future reference; and it has happened in not a few cases that the little things which at first escaped detection have subsequently proved of the greatest importance. When a new star was discovered two or three years ago, it was found possible by re-examination of these records to trace back its history for weeks before it had become conspicuous enough to attract attention. More recently the remarkable little planet heretofore known as "D. Q.," but for the future to be called Eros, has demonstrated the value of these photographic records.

This planet was discovered by Gustav Witt, of Berlin, August 13, 1898. Upon determining its orbit it was found that when nearest the earth its distance from us is only fourteen millions of miles—the nearest approach of Mars being two and one-half times as great. This planet, therefore, assumes an important place in the solar system, as it will offer at its next opposition in 1900 an unusual opportunity for obtaining a new solution of an old problem—that of the earth's distance from the sun: but for this purpose an accurate determination of its orbit is essential, and this calls for a more extended series of observations than can be had at a single opposition. A reference to the storehouse of photographs at the Harvard Observatory supplied the deficiency. The image of the planet was found on plates taken in 1893, 1894 and 1896, twenty-eight in all, with a promise of more. The means are, therefore, at hand for a precise investigation of the planet's motion.

I have mentioned only a few of the many problems which are engaging the best efforts of the astronomers of the present day; the vast department of the subject known as astro-physics has hardly been touched.

Two hundred years ago Huyghens published some investigations of the planet Saturn. He thought it necessary to preface his paper with a sort of apology for employing his energies upon a subject so remote from the practical affairs of life. To-day pure science is everywhere recognized as an object worthy to engage the best efforts of the human intellect, and no apology is deemed necessary for engaging in its pursuit.

But even from a material point of view, who can estimate the value to mankind represented by the disappearance of the superstitious formerly associated with various astronomical phenomena? The ability to look upon comets, eclipses, the Aurora Borealis and meteoric showers, without seeing in them the evidences of divine wrath, would have

saved the human race from many a calamity in the past, and would have possessed an actual cash value difficult to overestimate. To take but a single instance, what would it have been worth to the Athenian state, after the failure of the famous siege of Syracuse, had their general known enough of astronomy to appreciate the harmlessness of a lunar eclipse?

The remark is sometimes made that the study of our science has an oppressive and humiliating effect. From the exalted position which we have confidently believed to be ours, as the last and best of created things, it reduces us to something far less than the small dust of the balance. We can see with our largest telescopes perhaps one hundred millions of stars, each a sun, many of them vastly larger than our own. How many thousands of millions of planets may circle around these suns we cannot even conjecture: be that as it may, unless the inhabitants of such planets are endowed with vastly keener senses than we possess, it is impossible that a single one of them should know of the existence of this world of ours. If it were to be suddenly precipitated into the sun, and thus the elements literally melted with fervent heat, a slight increase in brightness of this, to them, distant star would follow—nothing more.

On the other hand, instead of feeling himself crushed into helpless apathy when a consciousness of the infinity of the universe dawns upon him, the scientific investigator finds it a stimulus to renewed effort. Confined to a mere atom of this vast universe, circumscribed and limited as we are, we can yet reach out into this infinite creation—we can learn something of its great plan and of the immutable laws by which it is governed. Yet here, perhaps more distinctly than in any other department of knowledge, is the truth brought home to us that

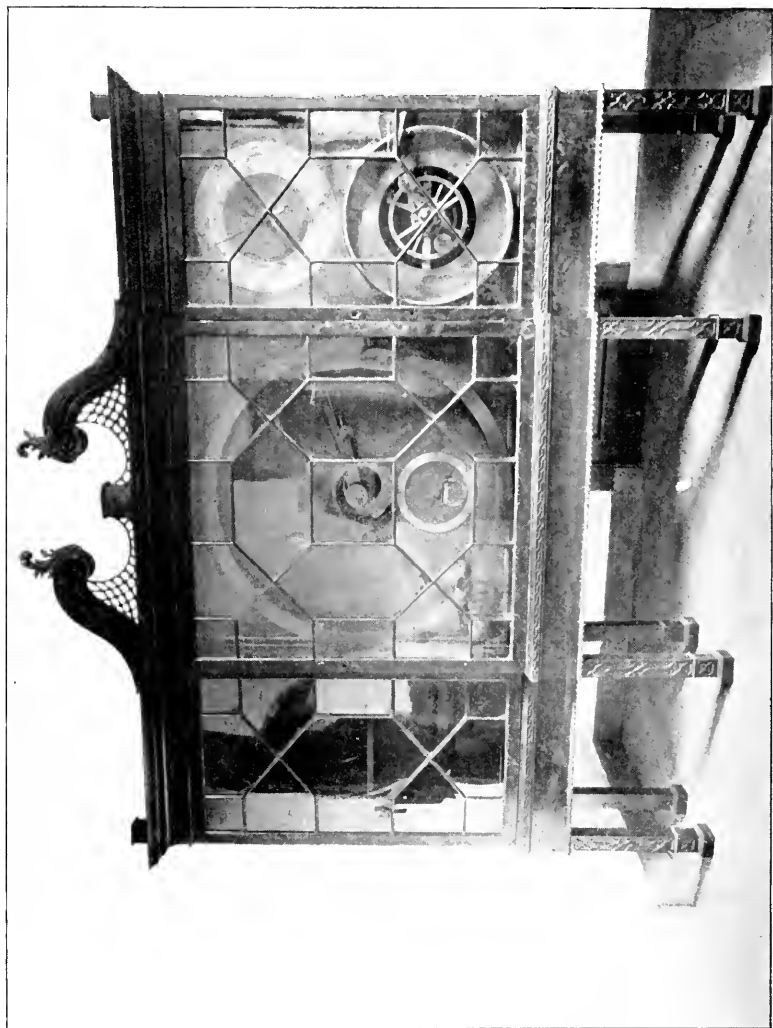
“Patience, patience is the watchword of the sage,
Not to-day, nor yet to-morrow can complete a perfect age.”



THE RITTENHOUSE "ORRERY."

The University of Pennsylvania has had in its possession for over one hundred and twenty years an object which was considered in revolutionary days to have been the greatest mechanical device in His Majesty's Colonies. Visitors came from abroad to see it, and scientists noted in their treatises the wonderful proficiency of its American inventor. The College of Philadelphia (now the University of Pennsylvania) received as much celebrity from the orrery constructed by David Rittenhouse, as it did from the exertions of that ingenious gentleman, Benjamin Franklin, and the brilliant scholarship of Dr. Smith. The "planetarium," or "orrery," played an active part in the life of the time—if such may be said of an inanimate object. It entered into the broad fields of science and the liberal arts, of politics, and of diplomacy. To-day the orrery receives but a passing glance from visitors, and its unique history is unknown even to some of our more prominent local antiquarians.

The first conception of a machine that would exhibit the orbits of the stellar bodies did not originate with David Rittenhouse. Planetariums were known in the time of the



THE RITTENHOUSE "ORRERY," NOW IN POSSESSION OF THE UNIVERSITY OF PENNSYLVANIA.

Greeks. Boethius is said to have constructed one. Richard Boyle, Earl of Orrery, from whom the orrery derives its name, patronized one that was made by Rowley for George I. The price paid for it was a thousand guineas. The orreries that had been constructed up to the time of Rittenhouse were not of scientific significance, but mere playthings, the baubles of kings and princes.

The project of a planetarium had long been nurtured in the mind of Rittenhouse: the clocks and timepieces he had made were famous throughout the colonies. Many of them are to be seen to-day in the houses of the descendants of provincial families, and in the cabinets of our older public institutions. The University of Pennsylvania owns one of these venerable hall clocks, and its rich walnut case and illuminated dial recall the days when it perhaps gave the hour for the opening session of the College and Academy of Philadelphia. In the earlier part of 1767, the idea of a planetarium having become fixed in his thoughts, Rittenhouse determined to construct one, and drew up his designs. On January 28, 1767, he wrote to his brother-in-law, Thomas Barton: "I did not design a machine which should give the ignorant in astronomy a just view of the solar system, but would rather astonish the skillful and curious examiner by a most accurate correspondence between the situations and motions of our little representatives of the heavenly bodies, and the situations and motions of those bodies themselves. I would rather have my orrery really useful by making it capable of informing us truly of the astronomical phenomena for any particular point of time; which I do not find that any orrery yet made can do."*

On March 27, 1767, Rittenhouse communicated to Barton the first description of his orrery: "I send you a description of *my* imaginary machine; the foundation of it is now laid, and I hope that part of it containing the

* *Memoirs of the Life of David Rittenhouse*, by William Barton. Philadelphia: Parker, 1813; p. 194.

mechanical astronomy of the moon will be finished some time this spring: *then* we shall be able to judge whether my abilities are equal to the undertaking."* Rittenhouse worked diligently upon it, and in the course of a year it looked as if his long cherished hopes would be realized. To the American Philosophical Society, the first and most renowned of the learned societies in America, he determined to impart his plan. In the first volume of the transactions of this organization will be found, "A Description of a new orrery planned, and now nearly finished, by David Rittenhouse, A. M., of Norriton, in the county of Philadelphia; Communicated† by Dr. Smith." In it is described, with great exactness and nicety, the plan of the planetarium. The machine was to have three faces,— "that in front," in the quaint language of its maker, "to be four feet square, made of sheet brass, curiously polished, silvered and painted in the proper places and otherwise ornamented. From the centre arises an axis to support a gilded brass ball intended to represent the *sun*. Round this ball move others, made of brass or ivory, to represent the *Planets*: they are to move in elliptical orbits, having the central ball in one focus, and their motions to be sometimes swifter, and sometimes slower, as nearly according to the true law of equable description of areas as is possible, without too great a complication of wheelwork. The orbit of each planet is likewise to be properly inclined to those of the others; and their *Aphelia* and *Nodes* justly placed; and their velocities so accurately adjusted as not to differ sensibly from the tables of astronomy in some thousand years." From this we may get some idea of the scope of the work and the difficulties Rittenhouse had to overcome before his planetarium would be completed. The machine was to be put in motion by simply moving

* Ibid, p. 198.

† Transactions of the American Philosophical Society, held at Philadelphia for promoting useful knowledge. Philadelphia: Bradford, 1771. Vol. i, pp. 1-3. The paper was read March 21, 1768.

a crank. There were to be three indices to it, which would point out the hour of the day, the day of the month and the year; and it would be in perfect accord with the situation of the heavenly bodies. The position of the planets would be determined in the same manner as though the observer was examining the sky itself. There was to be a minute telescope, and it could be so applied that the longitude and latitude could be calculated. "The part containing the astronomy of the *Moon* has been some time finished, and is found perfectly to answer, by many trials already made of it. The remainder of the work is now almost completed." Not trusting to the calculations of others, he constructed his own astronomical tables in order to insure perfect accuracy.

The orrery was finished by Rittenhouse in the early part of 1770. A description of it had been sent to Thomas Penn, of the Proprietary family, in London. He wondered at the cleverness of its constructor, and he could not imagine that such a thing could be "executed in Pennsylvania." The orrery, in its completed state, was perhaps as handsome an astronomical machine as was ever devised. It was enclosed in a mahogany case, most curiously carved, and the blendings of the metals—gold, silver and brass—were most harmonious, and the multitude of wheels, revolving balls and shining indices bewildered those who came to look upon it. The public, as well as the scientific world appreciated the merits of what was to be henceforth called the "Rittenhouse orrery."*

Who was to become the possessor of this most astounding machine? There were two competitors in the field, Princeton College, and the College and Academy of Philadelphia. Dr. Witherspoon, on the one hand, and Dr. Smith on the other, strove hard to procure the orrery for his own institu-

*Rittenhouse was probably assisted in the construction of his orreries by his brother Benjamin, who was also an instrument maker. Henry Voigt, later coinier of the United States Mint, also helped.

tion. They contended for it with as much energy and vim as the two universities some years ago fought for the football supremacy. Dr. Witherspoon, then president of the College of New Jersey at Princeton, accompanied by some of the gentlemen of the faculty, had viewed the planetarium at the home of Rittenhouse at Norriton. Having once gazed upon its fair proportions they determined to possess it, and used the weight of their persuasive powers to influence its instructor to cede it to them. Dr. Smith thought that the most fitting place for it was within the walls of the College of Philadelphia, for Rittenhouse had been well patronized by the citizens of Philadelphia, and the college had in 1767 bestowed upon him the honorary degree of Master of Arts. Sometime in May, 1770, the College of New Jersey became the possessor of the orrery, and it was transferred from Norriton to Nassau Hall. In the history of Princeton University, issued upon the occasion of the sesqui-centennial (New York, 1898) no mention is made of the acquisition of this famous piece of mechanism.* Perhaps if Dr. Benjamin Franklin had been at that time in Philadelphia, instead of enjoying himself with the nobilities abroad, the first orrery constructed by Rittenhouse would have remained within the state that saw its birth. The ransom paid for it by the trustees of the College of New Jersey was but three hundred pounds in the currency of the Province of Pennsylvania—a most modest sum.

The College of Philadelphia felt the loss of the orrery keenly. Some of its faculty, and many closely allied with the institution, thought the matter had not received fair treatment at the hands of Rittenhouse. "I never met with greater mortification," wrote Dr. Smith, "than to find Mr. Rittenhouse had, in my absence, made a sort of agreement to let his orrery go to the Jersey College. I had constantly

* This rather startling omission may also be noticed in the *Early History of the University of Pennsylvania, from its Origin to the Year 1827*, by George B. Wood, M. D., with Supplementary Chapters by Frederick D. Stone, Litt. D., Philadelphia, 1896.

told him that if the Assembly did not take it, I would take it for our college, and would have paid the full sum, should I have begged the money. I thought I could depend, as much as on any thing under the sun, that after Mr. Rittenhouse knew my intentions about it, he would not have listened to any proposal for disposing of it without advising me, and giving our College the first opportunity to purchase. I think Mr. Rittenhouse was never so little *himself* as to suffer himself to be taken off his guard on this occasion. This province is willing to honor him as her *own*; and believe me, many of his friends wondered at the newspaper article;* and regretted that he should think so little of his *noble* invention as to consent to let it go to a village; unless he had first found on trial that his friends in this city had not spirit to take it. For if he would wish to be known by *this work*, and introduced to the best business and commissions for instruments, from all parts of the continent—his *orrery* being placed in our college, where so many strangers would have an opportunity of seeing it, was the sure way to be serviceable to himself."

This letter of the provost's reflects in some degree the feelings experienced by the good citizens of Philadelphia at the loss of the orrery. It probably did not occur to them that another could be constructed, equal if not superior, to the one which reposed serene in its polished casing at the College of New Jersey. Rittenhouse, the historians tell us, was a philosopher. He recognized this point, and

*"It is with Pleasure that we inform the Public, that the *Orrery*, of which the *American Philosophical Society* formerly published an account, projected and executed by Mr. David Rittenhouse, in this Province, is now almost finished. As this is an American Production, and much more complete than anything of the kind ever made in *Europe*, it must give great Pleasure to every Lover of his Country, to see her rising to Fame in the sublimest Sciences, as well as every Improvement in the Arts. Dr. Witherspoon, accompanied by some Gentlemen, went Saturday last, to see and converse with the ingenious Artist, and being convinced of the superior Advantages that must arise from this new invented *Orrery* in the Study of Natural Philosophy, and desirous to encourage so truly great a Genius purchased it for the Use of the *College of New Jersey*."—*The Pennsylvania Gazette*, Thursday, April 26, 1770. An identical notice may be found in *Bradford's Pennsylvania Journal and Weekly Advertiser* of the same date.

shrewdly suggested the possibility of constructing another orrery, more ingenious and more wonderful than the first. Rittenhouse, in a letter to Barton, thus expressed himself: "I would not, on any account, incur the imputation of cunning; nor are there probably many persons living who deserve it less; yet I am greatly mistaken if this matter does not turn out to my advantage and consequently, to your satisfaction. At present, the point is settled as follows: I am to begin another (orrery) immediately and finish it expeditiously, for, since the making of a second will be but an amusement, compared with the first." "And who knows," Rittenhouse facetiously observes, "but the rest of the colonies may catch the contagion."

The indignation at the removal of the orrery to Nassau Hall was not confined to those interested in the College of Philadelphia alone. It was far more widespread. The Governor of Pennsylvania, when he heard of the decision of Rittenhouse, declared that the orrery should not go—he would rather pay for it himself. He declared that in his opinion the College and Academy of Philadelphia ought to have the first orrery, and not the second, even if the second should be the best.

The crowning achievement of David Rittenhouse as a mechanical genius was the second orrery—the one that now reposes in the University of Pennsylvania. It was not a mere replica of the orrery at Princeton, although like it in the general principles of construction. Its price was fixed at £300, not a large sum, but one that the College of Philadelphia found difficult in collecting. A course of lectures was given by Dr. Smith, to help defray the cost. The public crowded to hear them, and great interest in the planetarium was evinced by everyone. The provost, who was known as a mathematician and astronomer of some note, and who had assisted in observing the transit of Venus in 1769, described the mechanism of the orrery, and the great good that would result to the

College of Philadelphia on becoming its owner. As a result of these lectures, two hundred pounds were collected. The new orrery was finished about a year after the completion of the first, and proved to be the last constructed by Rittenhouse. It has been in continuous possession of the College of Philadelphia from the day it was delivered in 1771. The College, desiring to secure the services of Rittenhouse, asked him to take charge of the scientific laboratory. The following is a minute of the action taken by the Board of Trustees upon it:

"Nov. 19, 1771.

"Dr. Peters, in Behalf of the Trustees, sent for Mr. Rittenhouse and desired he would be so kind as to take Charge of the Philosophical Apparatus, and occasionally assist Mr. McDowel in lecturing upon the Experimental Parts of Natural Philosophy; to which Mr. Rittenhouse very obligingly consented."*

This seems to have been Rittenhouse's first official connection with the University of Pennsylvania. On December 16, 1779, he was appointed professor of astronomy, and on February 8, 1780, he was elected vice-provost of the University.

The history of the two famous machines does not end here. They were destined to play their part in the struggle that was soon to be fought out. Their history, like that of their constructor, must be included in the chronicles of the American Revolution.

State legislatures in the colonial period of Pennsylvania were constituted differently from those of our own day. They sometimes would give a bounty to those of their citizens who had done something to advance the honor of the State, although not in the diplomatic corps or upon the field of battle. Rittenhouse was one of those whom

* Minutes of the Trustees of the College, Academy and Charitable Schools. Vol. ii, p. 34. MS. In custody of the Assistant Secretary, University of Pennsylvania.

the governing body chose to reward for distinguished service in the cause of science. When the money was being collected to pay for the orrery for the College of Philadelphia, the Assembly realized the importance of it, and the fact that the price to be paid was but a pittance for such an undertaking. They therefore drew up a suitable preamble and resolution, wherein they recompensed Rittenhouse by giving him from the common treasury £300; and as a further recognition of his sterling worth requested that he construct another orrery for the "use of the public."

The order taken by the Assembly is here given *in extenso*:

"March 8, 1771.

"The Members of the Assembly having viewed the Orrery constructed by Mr. *David Rittenhouse*, a Native of this Province, and being of Opinion that it greatly exceeds all others hitherto invented in demonstrating the true Situations of the celestial Bodies, their Magnitudes, Motions, Distances, Periods, Eclipses and Order upon the Principles of the *Newtonian* System,

"*Resolved*, That the Sum of *Three Hundred Pounds* be given to Mr. *David Rittenhouse*, as a Testimony of the high Sense which this House entertains of his Mathematical Genius and Mechanical Abilities in constructing the said Orrery.

"And a Certificate of the said Sum being drawn at the Table, was signed by the Speaker, and delivered to Mr. *Evans*.

"*Ordered*, That Mr. *Evans*, Mr. *Rhoads*, Mr. *James*, Mr. *Rodman*, Mr. *Morton*, Mr. *Carpenter*, Mr. *Montgomery* and Mr. *Edmonds*, with the Speaker, be a Committee to agree with and purchase from Mr. *Rittenhouse* a new Orrery for the Use of the Public, at any Sum not exceeding *Four Hundred Pounds* lawful money of this Province." *

* Notes and Proceedings of the House of Representatives of the Province of Pennsylvania. Beginning the Fourteenth Day of October, 1767. Philadelphia: Henry Miller, 1776. Vol. vi, p. 301.

Later, in September 24, 1771: *

"The Committee appointed to treat and agree with Mr. *David Rittenhouse* for one of his newly invented Orreries for the Use of the Public, presented to the Chair a Report thereon in Writing, which was read by Order, and follows in these Words, *viz.*:

"The Committee appointed to agree with and purchase from Mr. Rittenhouse a new Orrery for the Use of the Public, beg Leave to report, that they have, in Pursuance of the Order of Assembly, agreed with Mr. *Rittenhouse* for a new Orrery at the Price of *Four Hundred Pounds*, the Sum limited by the House, to consist of one principal Square of eight Feet or more each Way, with two Wings, making in the Whole one large Front, as nearly resembling the Form of the Orrery now standing in the College of the City of *Philadelphia*, as its superior size will admit."

The orrery that the Assembly ordered of Rittenhouse was never finished. Perhaps it was never started. The transition period—the decade before the signing of the Declaration of Independence—were times of much disturbance and ill-feeling in the province of Pennsylvania. There were continual ruptures between the supporters of the "proprietary" and the opposition, or what may be called the "popular" party. The Assembly was divided into cliques made up of the two parties. The outbreak of the revolution in Pennsylvania, as in the other States, was but the culmination of conflicting opinions that had disturbed the peace of the province for many years. Rittenhouse entered with vigor into the struggle. He laid aside his gentle craft and astronomical researches in order that he might devote all his energies to the cause of the colonies.

The fame of the orreries spread. Visitors from the other colonies, and finally from other countries, viewed them with admiration. Thomas Jefferson, a man steeped in the

* Ibid, Vol. vi, pp. 330-1; also partially reprinted in Barton, p. 223.

science of his day, said : " We have supposed Mr. Rittenhouse second to no astronomer living, that in genius he must be the first, because he is self-taught. As an artist he has exhibited as great a proof of mechanical genius as the world has ever produced. He has not indeed made a world, but he has by imitation approached nearer its Maker than any man who has lived from the creation to this day."*

In 1774 the first Continental Congress met at Philadelphia. The orrery at the college on Fourth street was one of the "sights" of the city, and the delegates looked with astonishment upon the invaluable invention. Its constructor was beginning to take an active interest in the politics of the day, and his name was known throughout the provinces. John Adams, when on a visit to Princeton, wrote under date of August 27, 1774, " Here we saw a most beautiful machine—an orrery or planetarium, constructed by Mr. Rittenhouse, of Philadelphia. It exhibits almost every motion in the astronomical world ; the motions of the sun and all the planets, with all the satellites, the eclipses of the sun and moon."†

Many years later, long after the death of Rittenhouse, Adams wrote to Jefferson (March 14, 1814) concerning the orrery—and a slight touch of spleen may be noticed in it.—" As an anchorite, an honest dupe of the French Revolution ; a mere instrument of Jonathan Dickinson Sergeant, Dr. Hutchinson, Genet and Mifflin, I give him all the credit for his planetarium."‡

During the British occupation of Philadelphia, the orrery was an object of curious interest to the soldiery. Dr. Smith, who was a sympathizer in the cause of Great Britain, requested the commander of the English forces,

* The Writings of Thomas Jefferson; collected and edited by Paul Leicester Ford. New York : Putnam, 1894. Vol. iii, p. 169. Notes on Virginia.

† The works of John Adams. Boston: Little & Brown, 1850. Vol. ii, p. 355.

‡ Ibid., Vol. x, p. 90: The Writings of Thomas Jefferson. New York, 1859. Vol. vi, p. 324.

Sir William Howe, to protect in some manner the planetarium, for fear lest the soldiers might injure it. By order of Howe, the room which contained it was closed; and, we are told, "no person was permitted to enter the apartment to view the orrery, without the provost's consent; on which occasions he uniformly attended in person, with the keys kept in his possession."

When, through the fortunes of war, Philadelphia was relieved of its invaders, great solicitude was expressed by many as to the treatment which the orrery had received at the hands of the English soldiers. Thomas Jefferson was particularly anxious. "I sincerely congratulate you," he wrote to Rittenhouse from Monticello, on July 19, 1778, "on the recovery of Philadelphia, and wish it may be found uninjured by the enemy. How far the interests of literature may have suffered by the injury or removal of the orrery (as it is miscalled) . . . are doubts which still excite anxiety."

The one at Princeton was not quite so fortunate. When the British occupied the site of the College of New Jersey, the soldiers took a decidedly active interest in the orrery. They appropriated some of its intricate mechanism, and wheels were taken off as souvenirs of the war. The curiosity seeker was as rampant then as now. It was reported that the officers contemplated its removal to England—this at least shows that they appreciated its merits. To the honor of the officers, it must be also said that a guard was placed to protect it and keep it inviolate from the hands of the vandals. Later, after the battle of Princeton, and the retreat of the British from the town, the militia occupied the college buildings as barracks. They had not as much respect for the wonderful machine as the British soldiers. They toyed with its delicate wheels, and removed some of them. The militiamen, however, did not destroy the fine philosophical apparatus, then the property of Princeton College; the British had been there before

them, and accomplished this part of their duty in the most approved military fashion.*

When the "free and independent" States formally declared war upon Great Britain, Congress sent as a diplomatic agent to France a most extraordinary man—Silas Deane. His mission was to make a treaty of alliance between the two countries against England. Marie Antoinette and Louis then ruled the destinies of France, and Deane was most anxious to conciliate the queen. On November 28, 1776, he wrote to the secret committee of Congress, and suggested that the gift of various "trifles" would be "money well laid out with a certain personage." The orrery constructed by Rittenhouse was one of the objects which he asked Congress to grant him.† A week later he again wrote to the secret committee, that the "Queen was fond of parade, and I believe wishes a war, and is our friend." Again he suggests Rittenhouse's orrery as a fit object to win over the queen's influence. "It would be a great curiosity at the court at Versailles, where everything American is gazed at."‡

Barlow, in his "Vision of Columbus," alludes, in Popean couplets, to the fame of the Rittenhouse orrery.

* Various attempts have been made to restore the orreries to their first and original condition. From the History of the College of New Jersey, from its Origin in 1746 to the Commencement in 1851, by John Maclean, Philadelphia, 1877, many facts can be gleaned. On May 6, 1795, "Dr. Green was requested to wait upon Dr. Rittenhouse and request him to repair and complete the orrery belonging to the college." Vol. ii, p. 7. At a special meeting on January 13, 1796, Dr. Green reported that he had spoken to Dr. Rittenhouse respecting the orrery, but had not obtained any satisfaction on the subject. He was requested to pursue the matter. Vol. ii, p. 12. In 1796 the Legislature of New Jersey made a grant of money to the College on condition that "the money to be paid to said Trustees shall be laid out and appropriated to and for the repair of the buildings of the College, its library, Orrery and philosophical apparatus." Vol. ii, pp. 22-24. Mr. Henry Voigt, of the United States Mint, repaired this orrery as he had done that belonging to the University of Pennsylvania. "Beyond all question," remarks Dr. Maclean "it (the orrery) was regarded by the learned and the ignorant as the greatest mechanical contrivance of the age."

† Force's American Archives, 5th Series, III, 900. *Vide*, Historical and Biographical Sketches by Samuel W. Pennypacker, Philadelphia, 1883, which contains an interesting account of the orrery.

‡ The Revolutionary Diplomatic Correspondence of the United States. By Francis Wharton. Washington, 1889. Vol. ii, p. 214.

The Columbiad was once thought to be the great American epic, and perhaps it will not be out of place to reprint a few of its lines here :

" See the sage Rittenhouse, with ardent eye,
Lift the long tube and pierce the starry sky ;
Clear in his view the circling systems roll,
And broader splendors gild the central pole.
He marks what laws the eccentric wanderers bind,
Copies creation in his forming mind,
And bids, beneath his hand, in semblance rise,
With mimic orbs, the labours of the skies.
There wond'ring crowds with raptured eye behold
The spangled heav'ns their mystic maze unfold ;
While each glad sage his splendid hall shall grace,
With all the spheres that cleave the ethereal space."*

Interest in the orrery was long kept alive at the College of Philadelphia ; and for many years after the latter had become the University of Pennsylvania, the orrery itself was handed down to fame through reproduction as the sometime corporate seal of the Trustees.

ABRAHAM S. WOLF ROSENBACH.

"THE CHILDREN OF SAMUEL TAYLOR COLERIDGE."

[Report of a lecture delivered in the College Chapel by Mr. Ellis Yarnall.]

On Friday afternoon, March 3, an appreciative audience assembled to hear a lecture by Mr. Ellis Yarnall on "The Children of Samuel Taylor Coleridge." The peculiar advantages that Mr. Yarnall enjoyed in the intimate friendship of many of the notable literary men and women of this century rendered the personal reminiscences of the lecture of the deepest possible interest. Of the strange and fascinating personality of Hartley Coleridge, whom Wordsworth so loved that he wished to be buried beside him; of the remarkable linguistic attainments of his brother, Derwent; of the steadfast womanly character of Sara Coleridge; and of the indecisive

* The Vision of Columbus; a Poem in nine Books; by Joel Barlow, Esq. Hartford: Hudson and Goodwin, 1787; p. 208.

dual nature of the rare philosopher and matchless poet, "S. T. C.," as he was familiarly called by his children, Mr. Yarnall discoursed, enlivening his reminiscences with many interesting illustrative anecdotes. Samuel Rogers, in his very old age, calling from his chair to his man to find a morning disengaged in which to invite Mr. Yarnall to breakfast; Lord Macaulay reciting passages of *Paradise Lost*, and retiring early rather than walk up stairs; the coyness of Tennyson in reading his own verses, and the willingness of one who had asked him to read to have the great poet substitute Milton, with his remark that Milton was quite as good: these were some of the vivid bits of recollection which Mr. Yarnall gave his auditors, in a voice clear and firm, despite his eighty years, and in a style at once literary and charmingly familiar. It is with great pleasure that we announce that these delightful reminiscences are shortly to appear in book form.

AUXILIARY LECTURES BEFORE THE LAW DEPARTMENT.

(Concluded.)

The remaining auxiliary lectures on International Law and Legal History were delivered during March, before the students of the Law Department of the University of Pennsylvania and invited members of the Philadelphia Bar, by Talcott Williams, LL. D., and the Honorable Edward Ambler Armstrong, of Camden, N. J.

The introductory lecture of the course on International Law was delivered by Dr. Williams in "Congress Hall," on Wednesday, March 1. He spoke upon the "Legal and Administrative Relations of England and her Colonies," and explained how the present relations of the United States and her new possessions are analogous to those of England and her colonies. In order to obtain a knowledge of the colonial administration of England, he advised the study of the English cases on the colonial executive officers and legislatures. He then entered upon a detailed explanation and discussion of the administrative system employed by England.

The second lecture of the series was upon the "Doctrine of International Interference in European Affairs."

He pointed out that the interference of a nation or nations in the affairs of another sovereignty constitutes the equity jurisdiction of international law. It appears to redress evils consequent upon the strict observance of legal rights and relations. While not admitted by text writers, it has been in constant practice during the past century. Its exercise in Europe rests upon the treaty of Vienna in 1815. The first interference under this treaty was exercised by the Holy Alliance in 1820 in re-establishing the royal government of Naples; and in 1823, through the intervention of a French army, in re-establishing the royal government of Spain. Both were taken against the protest of England. England asserted that no portion of the powers of Europe had the right to interfere in order to alter or uphold the government of a European State, but that no action should be taken unless all the powers signing the treaty took part. But these interferences having been accepted as accomplished facts, they were succeeded by the interference of three powers—Russia, England and France—in order to establish the Grecian insurrection as an independent government. This interference was based upon the ground of humanity and injury to trade. In 1830 a congress of five powers—Austria and Prussia added to the three just mentioned—interfered to prevent the suppression of the revolt of Belgium by the Netherlands. The Netherlands having refused to accede to the decree of the congress, it was executed by two of the powers, France and England, acting in conjunction.

The western powers, France and England, next united in diplomatic interference, proposing forcible interference if the other powers would join, to prevent in 1831–32 the incorporation of Warsaw by Russia, and in 1846 of Cracow by Austria. Both powers claimed that, while protected by the treaty of Vienna, these territories had lost their rights through revolt, which like war, destroyed treaties. In Switzerland and in Italy the powers, first through the treaty of 1856, and later through the intervention of France and England, asserted the right to improve the internal organization of one and the internal government of the other, in order to promote the peace of Europe.

This closed the series of interferences which preceded the recasting of Europe by the Franco-Austrian, the Austro-German and the Franco-Prussian wars. While no interferences took place in these cases, the wars were preceded by a proposal for the congress, whose rejection by Austria in 1866 ended the possibilities of peaceful solution. In 1878 the powers, upon the initiative of England, through the Berlin congress, interfered to recast the results of the Russo-Turkish war. For the first time under this congress, arrangements were made for a series of commissions to administer the results of the treaty.

During the last twenty years, in events still fresh, there has come a final acceptance of the following general principles of interference :

“ First : that it is conducted in the name and for the good of Europe as a whole, in order to preserve certain received standards of legitimacy and administration, the one covering interference for the purpose of maintaining order, and the other in order to prevent inhuman administrative acts.

“ Second : that while a decision can be reached in a congress by vote, it can be obtained during negotiations only by unanimous consent. In this action only the six great powers are considered. Their disposition of the interests of lesser powers is conducted with the attendance of their representatives, but without granting them a vote. The practical result has been that, while effective when exercised by a congress, the principle and practice of interference has proved ineffective when disagreement exists between the powers as to its object, as notably in the past four years.”

He closed the series on Wednesday, March 15, with a lecture on the “ Doctrine of International Interference in American History.” He reviewed briefly his former lecture in which he developed the doctrine of interference as applied to the European nations, where the basis of the present conditions is the treaty of Vienna, and where the affairs are regulated by six great powers.

The following is the substance of his closing lecture: “ The European system of interference, starting with the treaty of Vienna, has its legal basis in the general acceptance of mutual responsibility for massacre, insurrection and maladministration

in a European state which affects the general well-being of Europe. This responsibility is exercised by the six great powers, but as this exercise must be by unanimous consent, unless one, two or three powers take the initiative, the practical exercise of this responsibility has been cumbrous and inefficient.

“Turning to the New World, no such differentiation between the great powers and lesser exist. There is no system and no definite responsibility. In Europe, with 380,000,000 of population divided between sixteen states, the largest, Russia, has only one-fifth of this population, and six are on an even parity in their defensive powers. In the New World seventeen states divide 140,000,000 of population; and one of these states has over one-half of this population, and an overwhelming preponderance of wealth and efficient military strength.

“In considering interference in the system of the New World, we begin with the fact that all American states, from the United States to Cuba, have owed their independence to international interference, direct or indirect. European interference with the affairs of the New World, which began with complete sovereignty, has slowly diminished through the century. Uruguay was established by Great Britain as an independent State in 1828, and protected in 1845; and this state, in its war with Argentina, 1839, relied on French aid.

“A long ‘*pacific blockade*’ by France and England of Argentina was intended to alter the administration of the republic. A joint interference of England, France and Spain for the collection of claims in Mexico in 1861, grew, in 1862, into an attempt by France to establish an imperial government there, which collapsed through the interference of the United States. Finally in 1895, the Venezuela case summarily ended even encroachment by a foreign power on an American state. This gradual disappearance of all European interference is generally regarded as the result of the attitude of North America. But there has been a similar resistance to it in South America. In the case of Mexico, an alliance was formed between Colombia, Peru and Chile to aid Mexico.

“The removal of all European interference has left in South America a system of ten states whose public law was formu-

lated in the protocol of Caracas in 1885, on the two principles—that the right of conquest is forbidden, and that the boundaries of each State are to be determined by the Spanish or Portuguese vice-regal boundaries in existence in 1810; neither of these rules has ever been accepted by the United States, though they were embodied in the draft of treaty by the American conference of 1890.

“Passing over many minor cases of interference in South American history, a classic example is the treaty between Argentina, Brazil and Uruguay in 1865, to change the government of Paraguay without compromising its independence or territory—a treaty carried into effect after a bloody war, in 1870. Interference by the United States in the internal affairs of territory held by another sovereignty began in the occupation of East and West Florida, and of Amelia Island, on the claim that where contiguous territory was in disorder a neighboring power had a right, without prejudicing its ultimate title, to occupy and administer it. The same right was exercised for the suppression of Indian excursions upon the frontier of Mexico at various intervals for thirty years, from 1847 to 1878, without the permission of Mexico.

“In like manner by treaty the right of police has been secured over the Isthmus of Panama, a direct interference with the administration of Colombia. This direct territorial interference has been accompanied by wider interference with the foreign relations of American states, in what is known in our history as the Monroe Doctrine, which, broadly considered, is a part of the exercise of interference with the normal rights of other sovereignties.

“This began with a pledge of opposition to the projected action of the Holy Alliance in restoring Spanish authority over revolting colonies. In 1848, President Polk extended it to the prohibition of the cession of any American country to European sovereignty. This was repeated in 1852, and enforced in Mexico in 1865–67. It reached its final development in the assertion that on the American continent the usual encroachment of a civilized on a semi-civilized power, habitual in Asia and Africa, could not take place: a principle enforced in the Venezuela case in 1895–96.

“Throughout the exercise of interference in America no declaration of responsibility for the character of internal administration or conditions has taken place, except in the case of Paraguay, 1865-70, and of Cuba. Following its policy of responsibility for contiguous territory, the United States successively prohibited the conquest and cession of Cuba by any European power; by Mexico or any American power; and guarantee of its Spanish possession by any European convention: and refused itself in 1852 to guarantee Spanish possessions, since the condition of Cuba might at some future time render interference necessary. This interference at last took place forty-six years after its original enunciation.”

Summing up international interference in the two systems, Dr. Williams pointed out that in Europe the responsibility is accepted, and power exists to exercise it, but the exercise of this power is inefficient: in America, while the responsibility has come to exist through the protection of all American states by the power of the United States, its prohibition of their cession of territory and its limitation of all hostile operations against them to temporary occupation of their territory, no mutual responsibility has yet been generally assumed for internal misgovernment or maladministration, as in Europe. Except in cases of Paraguay and Cuba, the power to enforce this responsibility has not been exercised. Whether this power will be exercised by the individual action of the United States as the protector of the Western World, or by the joint action of American powers, remains a subject to be adjudicated by future events.

The Honorable Edward Ambler Armstrong, a Judge of the Common Pleas Court of Camden, closed the series of auxiliary lectures for the season of 1899-1900, on Wednesday, March 15. He spoke upon the courts of New Jersey. He explained that the legislation of our ancestors was admirably adopted for growth, especially in judiciary matters; after which he proceeded to give a description of the origin of the courts of New Jersey. During his address he said:

“The courts as well as the legislature are created by, and owe their authority to the same source—the people. The courts are a part of the great scheme of self-government. Ours is a

government of law. The courts are the particular safeguard of the people.

"A lawyer works for the future. He draws no paper without weighing all the possibilities. The courts can never be better than the bar. If the standards of the bar be low, one need not look to the courts for relief. The creature will not be greater than its creator. The peace, prosperity and welfare of the future depend largely upon the lawyer, and this I think every good lawyer recognizes."

ABSTRACTS OF RECENT PAPERS.

A Low-German Ballad.

DANIEL B. SHUMWAY.

[Read before the Germanic Association, February 8, 1899.]

The library of the University of Göttingen possesses the manuscript of a Low-German song, which according to its title had been composed to commemorate the futile attempt made by Piccolomini, the Austrian general, to take the town of Göttingen during the thirty years' war in 1641. In addition to this manuscript there is also a printed copy of the song, and a closer examination reveals the fact that the manuscript is but a copy of the print. The ballad was composed by a Göttingen student and printed in 1730. Although the date of writing is not given, it is probable that the author was not a witness of the events he describes, but wrote the song under the stimulus of historical studies shortly before the date of printing. The ballad, which was read in full, has of course mainly a local interest as it commemorates no great battle of the thirty years' war. At the same time it is not devoid of a certain broad, though crude, humor, especially characteristic of the North German peasant. In Dittfurth's collection of "*Historische Lieder*," there is found a ballad commemorating the battle of Treves in 1675, the opening lines of which are very similar to those of the Göttingen poem. A careful examination has shown, however, that these two ballads have most probably no connection with one another, but that each was written in imitation of the older and exceedingly popular ballad of *Henneke Knecht*, which is given by Bolme, *altdeutsches Liederbuch*, as No. 463. The author of the ballad of Treves followed the *Henneke Knecht* in the first two stanzas only, and then inspired by his own theme, struck out on independent lines. The result is a poem of decided merit, perfectly original with the exception of the opening stanzas. The unknown Göttingen student, however, who described the siege of the town, evidently considered his muse too feeble to attempt an independent flight, or else felt that the very similarity of

his poem to the older one might guarantee its popularity; for he followed his model so slavishly that almost every stanza bears evidence of copying. The rest of the paper was taken up by a detailed comparison of the two poems, showing in just what way the author had made use of his model, and closed with an examination into the dialect in which it was written, and which differs greatly from that of the *Henneke Knecht*.

Some Half-Forgotten Translations of Klopstock's "Messias."

DANIEL B. SHUMWAY.

[Read before the Language Union, March 10, 1899.]

It will be remembered that the first three cantos of Klopstock's "Messias" appeared in the "Bremer Beiträge" in 1748, and at once became the centre of literary interest in Germany. The enthusiasm thus awakened soon spread beyond the national boundaries, and other nations began to translate the poem into their native tongue. The first to do so were the French. In the early '60's Mr. and Mrs. Collyer began a prose translation into English, which appeared at intervals from 1763 to 1769, embracing fifteen cantos. Finally, in 1811, nineteen cantos were published, the last three translated by Mrs. Meeke. This translation, although wretched, satisfied the London publishers, so that when a German schoolmaster appeared with a complete translation in blank verse, he was everywhere dismissed with the remark that no further translation of the "Messias" was needed. Fearing that the labor of years would be lost for want of a publisher, the author determined on returning to Germany to present his manuscript to the library of the University of Göttingen. This he did in 1820. Having succeeded in interesting some wealthy men of Hamburg in his poem, it was finally published in 1821-22.

The name of this schoolmaster was George Heinrich Christian Egestorff, who, according to some autobiographical notes prefixed to the manuscript, was born in Osterwald, near Hanover, May 28, 1783. When a boy of seventeen he went to London, and returned to Germany after an absence of seventeen years, in 1817. No encyclopædia seems to have recorded his name, but from the titles of the books published by him, as given in the catalogue of the British Museum and in Kayser's "Bücherlexikon," he seems to have supported himself by teaching English and German. The edition of his poem must have been very limited, partly because it was published in Germany, and partly because the English book market was already supplied with a translation. One copy however exists in Göttingen, two in the British Museum, and one in the Astor Library. It is probable that still a few others are to be found in Germany. Prefixed to his manuscript and to the printed text are prefaces, in which Egestorff gives the history of his translation and speaks disparagingly of the English prose translation. In spite of his German birth, Egestorff's English is excellent and his translation admirable. Upon publishing his translation he subjected it to a complete revision, correct-

ing and changing expressions, substituting for them others which he considered more poetical or accurate, or which rendered the metre more perfect. In many cases he expanded quite considerably. The translation is far superior to its predecessors, the prose translation of Collyer failing not only in reproducing the poetry of the original, but also in the point in which a prose translation should be especially strong, viz.: in accuracy.

In the London "Christian Instructor or Congregational Magazine" for 1821-22 there appeared a translation of all of the first canto, sixty-one lines of the second, and one hundred and thirty-five lines of the third, canto of Klopstock's "Messias." It is in English hexameters and without name, the translator's preface being signed with a Δ. This partial translation is excellent. The hexameters are as a rule good, and the author has succeeded not only in being accurate, but in preserving remarkably well the poetic spirit of the original. The perusal of the passages which the unknown translator has rendered into English makes one regret that the author for some reason or other did not continue the translation thus begun.

Another attempt to translate a part of the "Messias" was made in this country, in Georgetown, S. C., by the Rev. Solomon Halling, as early as 1810. It consists of a translation of the first canto into blank verse. It is not, however, what it claims to be, namely, a "translation from the German of the celebrated Mr. Klopstock," but a mere working over of Collyer's prose translation. A comparison with the latter will dispel all doubts of this, for the prose translation deviated greatly from the original, and all these deviations are faithfully reproduced by Halling. Except for the slight rearrangement of the words, the author might with justice have the ugly name "plagiarist" applied to him.

From the accounts of the various attempts to translate Klopstock's "Messias" which have been given, it is apparent that Eggestorff's is the only complete one. For that, if for no other reason, it deserves a better fate than has befallen it. It is also an accurate translation, for its author brought to it what his predecessors, and perhaps some of his successors, did not possess, namely, an accurate knowledge of German. As it is safe to say that no one at this late day could be found possessed of such indomitable energy as to attempt the task of translating the whole of the "Messias" into English verse, Eggestorff's translation will probably remain unique—the only complete English translation of this famous poem.

The Rise of Formal Satire in England.

RAYMOND M. ALDEN.

[Paper read before the Language Union, March 10.]

In this paper the rise of satire in England in the sixteenth century, under classical influence, was discussed. The distinction was made between satire as a natural mode of expression, and satire recognized as a separate literary form. The former was common in all mediæval liter-

ature, and in that of England before the Renaissance: the latter was adopted under the influence of the study of Horace, Juvenal, and Persius, first in Italy, afterward in England and France. A number of distinctions between the early popular satire, beginning with the "satire of fools," and extending through the Reformation, and that developed under classical influence, are to be noted as tests for comparison.

The list of English satirists treated in detail begins with Wyatt, 1542, and extends to the accession of Charles I. The most important names in the list are those of Donne, Hall, Marston, Wither and Jonson. Most of the English satirists adopted the severe type of satire indicated by Juvenal rather than the urbane type of Horace, Wyatt being almost the only exception. In the full treatment of their work, the evidences of direct imitation of the classics are considered in detail. In general, this imitation became more and more remote, so that at the opening of the seventeenth century the "satire" had become simply a general poem devoted to the rebuke of vice, and might take on any form suited to the genius of the author. There was always severe treatment of contemporary follies and vices, usually with some exaggeration and much pessimism of temper. The various fashions and sins which were commonly satirized deserve considerable study as illustrative of the life of Elizabethan England.

In general, the formal satire did not take a firm place in English literature until a later period than that under immediate consideration. In the days of Elizabeth young poets adopted it as a fashionable form of the day, but soon left it for other work. It was not suited to the enthusiastic romantic spirit of the time, being of a pessimistic and conservative type. Its best material could be better expressed in other forms,—either in prose pamphlets or the drama. But later, when verse had become a vehicle for what was earlier treated in prose, when the spirit of the age was critical, when the drama itself had become a convention, these hindrances disappeared; then Dryden, the greatest poet of his time, could show his strength in formal satire.

Publications

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* For exchange purposes only.

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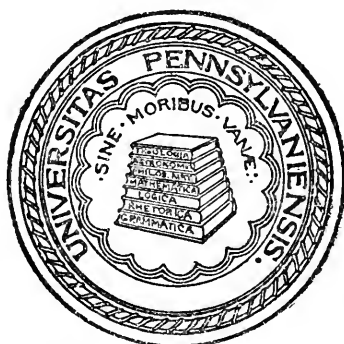
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of 6 Hours



Ludwig



Rock life



the address & make it the place of the
house given to by the British, now 144
to find & follow down my "gully"



Telphron



Ed 46 conference



Word

CLASS OF 1811 SILHOUETTE "NEGATIVES."

Through the courtesy of Mrs. Thomas H. Clay, of Philadelphia, the University has come into possession of a unique and highly valuable collection of portraiture of the entire personnel (with one exception) of the College Class of 1811, of which her father, the late Benjamin Gratz, was a graduate.

The collection is in the form of what may perhaps best be described as silhouette "negatives," *i. e.*, small squares of white paper, in the centre of which are cut out the profiles of the several members. Additional interest attaches to the collection from the fact that each profile is subscribed with the autograph of the original. From embossings on the paper it would appear that the work was done at "Peale's Museum," under the direction of its celebrated proprietor, Charles Wilson Peale. The "negatives" have been mounted carefully for exhibition on a dull black background, and thus their appearance in the reproduction is in silhouette. In connection with the cut and this brief description, a biographical sketch of each member of the Class of 1811 is also reprinted from the "Biographical Catalogue of the Matriculates of the College" (Philadelphia, 1894), the life of Benjamin Gratz being amplified in the light of additional information kindly furnished by his daughter.

Joseph Barr, A. M., 1821.

Entered 1808. Clergyman.

Robert Barr Belville.

b. New Castle, Del., 1790; d. Dayton, O., June 5, 1845. Entered 1808. Studied at Theol. Sem., Princeton, N. J. Teacher, afterward Presb. Clergyman. Pastor Neshaminy Ch., Bucks co., Penna., 1812-37. m. Mary, dau. Chambers Gaw, Phila. See *Hist. Neshaminy Presb. Ch.*, *Presb. Encyc.*

Thomas P. Bennett, A. M., 1816.

Registered as fr. Md. Entered 1808.

Richard Biddle, A. M., 1815.

b. Phila., Mch. 25, 1796; d. Pittsburg, Penna., July 6, 1847. s. Charles Biddle, Vice-Pres. Penna., and Hannah Shepard. Entered 1808. Lawyer. M. C., 1837-41. Author "Life of Sebastian Cabot." m. Ann Anderson, Pittsburg, Penna. See *Appleton. Autobiog. Charles Biddle. Allibone.*

Clement Adam Buckley, A. M., 1815.

b. Competence, Lancaster co., Penna., June 1, 1791; d. Phila., Apr. 13, 1868. s. Daniel Buckley and Sarah Brooke. Entered 1808. Lawyer. m. Sarah, dau. Charles Penrose.

Thomas King Carroll, A. M., 1815.

b. St. Mary's co., Md., —; d. near Church Crk., Dorchester co., Md., Oct. 3, 1873. s. Col. Henry James Carroll and Elizabeth Barnes King. Entered 1808. Lawyer. Mem. Md. Legis. Gov. Md., 1829-31. m. Julia, dau. Henry Stevenson, M. D., Balto., Md. See *Schultz's Hist. Freemasonry in Md.*

Alfred Henry Dashiell, A. M., 1815. (D. D., Maryville Coll., Tenn., 1850.)

b. Somerset co., Md., Aug. 2, 1793; d. Brooklyn, N. Y., Mch. 18, 1881. Entered 1808. Presb. clergyman. Pastor Mariners' Ch., Phila.; of Presb. Ch., Jacksonville, Ill.; and of Presb. Ch., Franklin, Tenn.; and at Shelbyville, Tenn. Pres. Nashville Female Acad. Pres. Rogersville, Tenn. Coll. Published a number of sermons. m. Ann, dau. Hon. Richard Ridgely, Md.

Richard De Butts.

Registered as fr. Md. Entered 1808.

George Duffield, A. M., 1815. D. D., 1841.

b. Strasburg, Lancaster co., Penna., July 4, 1794; d. Detroit, Mich., June 26, 1868. s. George Duffield and ——. Entered 1808. Presb. clergyman, and held pastorates in Carlisle, Penna.; Phila., N. Y. City and Detroit, Mich. Regent Univ., Mich. Published "Regeneration;" "Claims of Epis. Bishops Examined;" "Travels in the Holy Land," and various discourses and addresses. m. Isabella Graham Bethune, N. Y. City. See *Appleton. Harris' Biograph. Hist. of Lancaster Co., Penna.*

Samuel Duffield, A. M., 1815. M. D., 1817.

b. Strasburg, Lancaster co., Penna., July 3, 1795; d. Salisbury, Lancaster co., Penna., Feb. 24, 1853. s. William Bryant Duffield, M. D., (Class 1786) and Sarah Slaymaker. Entered 1808. Physician. One of the founders Lancaster Co. Med. Soc. m. Maria, dau. Cadwalader Morris, M. D.

Joseph Patterson Engles, A. M., 1815.

b. Phila., Jan. 3, 1773; d. Phila., Apr. 14, 1861. s. Silas Engles and Annie Patterson. Entered 1808. Tutor, 1812-17. Teacher. Publishing agt. of Presb. Ch. Edited a pocket ed. Gr. Test., with various readings. m. Harriet P., dau. Solomon Allen, Phila.

Charles Pemberton Fox, A. M., 1815.

b. Phila., 1792; d. Phila., Oct. 10, 1866. s. George Fox (Class 1780) and Mary Pemberton. Entered 1808.

Benjamin Gratz, A. M., 1815.

b. Phila., Penna., Sept. 4, 1792; d. Lexington, Ky., March 17, 1884. s. Michael Gratz, a native of Langendorf, Upper Silesia, who came to America in 1759, and lived in Lancaster, Penna., and in Philadelphia, where for many years he was a prominent merchant. His name, and that of his brother Barnard, appear among the signatures to the "Non-Importation Resolutions, October 25, 1765." Michael Gratz married in Lancaster, Penna., June 20, 1769, Miriam, daughter of Joseph Simon, a distinguished citizen of that place.

During the war of 1812, Benjamin Gratz was second lieutenant, and afterward first lieutenant, of the "2nd Company of Washington Guards in the 102nd Regiment of the Militia." At the close of the war he studied law in Philadelphia with William Meredith, and was admitted an attorney of the Supreme Court of Pennsylvania, October 15, 1818. He practiced law but a short time, and afterward went West on business connected with the large landed estate of his father. In 1819 he removed to Lexington, Kentucky, where he spent the remainder of his long and useful life. He was one of the incorporators of the Lexington & Ohio Railroad, the pioneer road of the West, and because its second president. For fifty years he was a trustee of Transylvania University, and gave to it his time, his means, and the benefit of his mature experience, being always deeply interested in the advancement of education in Kentucky. He was twice married (1st, Maria Cecil, dau. Col. Nathaniel Gist; 2d, Anna Maria Shelby, *née* Boswell, widow of Orville Shelby, Ky.), and was the father of eight children, two of whom survive him. He died in Lexington, in the ninety-second year of his age, in the house which for sixty-four years had been his home.

Samuel Blanchard How, A. M. 1815. (D. D., Union Coll., 1830.)

b. Burlington, N. J., Oct. 14, 1790; d. New Brunswick, N. J., Feb. 29, 1868. s. ———. Entered 1808. Tutor, 1812. Clergyman Ref. Dutch Ch. Pastor Solebury, Penna., 1815-16; First Ch., Trenton, N. J., 1816-21; First Ch., New Brunswick, N. J., 1821-23; Indep. Ch., Savannah, Ga., 1823-27; Bowery and Ninth Ave. Ch., N. Y. City, 1827-28; First Ref. Dutch Ch., New Brunswick, N. J., 1832-61. Pres. Dickinson Coll., 1830-32. Trustee Rutgers Coll.,

1833-68. Published a number of sermons. m. Mary, dau. Isaac Snowden. See *Appleton. Rev. E. T. Corwin's Manual Ref. Ch. in Am.*

Lynford Lardner, A. M., 1815.

b. "Somerset," near Phila., June 12, 1792; d. "Somerset," near Phila., June 22, 1834. s. Hon. John Lardner and Margaret Saltar. Entered 1808. Mem. Penna. Legis., 1820-21, 1833-34. Private First Trp. Phila. City Cav., Mt. Bull Campaign, 1813. Capt. First Trp. Phila. City Cav., 1825-27. m. Elizabeth A., dau. James Wilmer, Phila. See *Keith. Hist. First Trp. Phila. City Cav.*

Rider Henry Ratcliffe.

Presumed to have come fr. Md. Entered 1808.

Thomas M. Ross.

Entered 1808.

Isaac Clarkson Snowden, A. M. and M. D., 1815.

b. Princeton, N. J., Dec. 31, 1791; d. Phila., Nov. 8, 1843. s. Isaac Snowden and Cornelia Clarkson. Entered 1808. Physician. m. Maria Meares. See *Memoir of Gerardus Clarkson, M. D., by Samuel Clarkson.*

James Tilghman, A. M., 1815. (M. D. elsewhere.)

b. Talbot co., Md., May 1, 1792; d. Talbot co., Md., Mch. 22, 1824. s. Hon. James Tilghman (Class 1766) and Elizabeth Buly. Entered 1808. Physician. See *Keith, Hanson.*

Richard Clement Wood, A. M., 1815.

b. N. J., —; d. N. J., —. s. James Wood and Ruth Clement. Entered 1808. Lawyer. m. —. See *Mrs. Juliana R. Wood's Family Sketches.*

Samuel Wylie, A. M., 1815. (D. D., elsewhere.)

b. Ballymena, co. Antrim, Ireland, Feb. 19, 1791; d. Eden, Randolph co., Ill., Mch. 20, 1872. s. Andrew Wylie and Elizabeth Wylie. Entered 1808. Presb. clergyman and pastor Bethel Ch., Eden, Ill., 1821-71. m. 1st, Margaret, dau. William Millikin, Phila.; 2d, Margaret Ewing, dau. Rev. John Black, D. D., Pittsburg, Penna.

HISTORICAL SKETCH OF ACADEMIC COSTUME USAGE AT THE UNIVERSITY OF PENNSYLVANIA.

On the minutes of the Corporation, under date of May 30, 1765, record is made of the fact that "The provost, vice-provost, and professors, followed by the candidates (for degrees) and students, entered next *in their proper*

habits; and at 10 o'clock the solemnity (commencement exercises) began:" and similar language (*i. e.*, "in their proper habits,") is used in recording the commencement exercises held respectively on May 20, 1766, and June 21, 1768. From these records, therefore, it is clear that some definite academic costume was in use in the year 1765; and the inference that this costume consisted of a *gown* seems equally justifiable, since no other "habit" "proper" to academic ceremonies is conceivable. Starting, then, from the year 1765, we find no special mention made in the minutes of the Corporation as to academic costume until the year 1813, when (November 23) the following decree is recorded: "*On all public occasions, the professors shall be habited in gowns; and the students also, except those whose parents or guardians may object thereto, shall provide themselves with and appear on the same occasions in collegiate gowns, which shall distinguish their respective grades in college.*" The use of the gown thus prescribed continued in vogue until the year 1865, when the cap or "mortar-board" was added by action of the Class of 1862, who in that year came forward in a body at commencement to receive the A. M. degree. For twenty-two years thereafter, the cap and gown (plain) continued in use, until 1887, when what was known as the "Pennsylvania" system of academic costume was approved by the Corporation. Under its provisions no hoods were prescribed, the costume consisting simply of cap and gown, the latter being ornamented by certain colored trimmings to indicate the "faculty" with which the wearer was identified. Members of the several faculties, as well as holders of degrees, were permitted to wear silk gowns, while the undergraduates were limited to those made of "stuff." The undergraduate was entitled to wear a twisted silk cord of appropriate color outlining the yoke of the gown. On becoming a bachelor, he added to this (or replaced it by) a complete yoke of silk, of the proper color; and, if he afterward became a

master or doctor, he was authorized to add to the yoke bands on both sides reaching to the bottom of the gown. The cap was in all cases unornamented, save by a black silk tassel. The "faculty colors" under the "Pennsylvania system" were as follows: Arts, marine blue; philosophy, sapphire blue; science, light blue; music, pale blue; law, purple; medicine, crimson; dentistry, pink; veterinary medicine, cardinal. In this connection it should be stated that, while no hoods were prescribed by this system, a few were actually made and used by recipients of the degrees of Mus. Bac., Mus. Doc., and B. D.* upon their demand. These hoods were of black silk, lined with silk of the appropriate faculty color, and fashioned after the regulation Oxford pattern.

The intercollegiate system of academic costume, consisting of cap, gown *and hood*, was formally adopted by the corporation in 1895, with certain modifications necessitated by local organization and requirements. These modifications will be noted and commented upon briefly below. The "intercollegiate system" was adopted "in order that the administrative officers, members of faculties and graduates of this University may appear in appropriate academic costume on official occasions," such as, for instance, Commencement Day, University Day (February 22), and at other similar exercises.

In adopting the present system, the Corporation, after mature consideration, struck out the clause empowering members of the governing board, *as such*, to assume the costume appropriate to the highest degrees. This action was taken on the ground that a costume indicated the degree held by the wearer; and that no member of the corporation who did not hold a degree ought to assume a costume to which he was not duly entitled.

* Not now conferred by the University of Pennsylvania, which has no faculty of theology. The degree of B. D. was previously conferred upon A. B.'s of three years' standing or more, who had completed the regular course in some recognized divinity school.

Another somewhat radical modification in the system as adopted was in prescribing that holders of the degree of Doctor of Medicine (M. D.), Doctor of Dental Surgery (D. D. S.) and Doctor of Veterinary Medicine (V. M. D.) should wear gowns and hoods similar in all respects to those prescribed for *Bachelors*, save in the case of the binding or edging corresponding to the appropriate faculties. This ruling made it possible to discriminate definitely between the three ancient orders of degrees—bachelors, masters and doctors—each rank having its appropriate and distinctive academic costume. Having in view these three grand divisions, of which the doctorate is the highest and the baccalaureate the lowest rank, it was at once seen that holders of M. D., D. D. S. and V. M. D. were manifestly not of the rank of masters. Equally impossible was it to rank them as entitled to wear the academic costume appropriate to the highest university degrees, such as Ph. D., LL. D., Sc. D., etc., etc.,—quite as impossible as it would be to grant the use of a general's uniform to a man holding the rank of a captain in the army. There was, therefore, no course left open other than to class the holders of M. D., D. D. S. and V. M. D. degrees in the same rank with Bachelors of Arts, Science, Music or Laws, notwithstanding the fact that the degrees read "Doctor." It was not without the greatest reluctance that the general terms of the "intercollegiate system" were thus overruled; but at the same time the feeling was unconquerable that to costume the holders of these degrees—honorable as the latter are in themselves—in the same habit as holders of the highest degrees, would be in every way inconsistent and unwarranted.

The only other modification of importance was the addition to the list of faculty colors of lilac and steel-gray, to indicate respectively the faculties of Dentistry and Veterinary Medicine. These faculties had no colors assigned to them—indeed, were not mentioned at all—in the intercol-

legiate system as originally proposed to the universities; nor had these colors been appropriated to indicate any other faculties in the general color scheme. Hence, the University selected lilac for dentistry and gray for veterinary medicine in 1895, the choice being duly recorded by the intercollegiate bureau.

As stated in a foregoing paragraph, full academic costume is required by statute to be worn at the University of Pennsylvania by all University officers at Commencement, and on other similar public occasions. All candidates for degrees in course must be present at Commencement in person (unless specially excused), habited in the full academic dress appropriate to the degree they expect to receive. Candidates for honorary degrees, when present, are expected to appear in the gown distinctive of the degree voted to them by the Corporation; and when the degree is conferred, they are endued with the appropriate hood (the gift also of the Corporation). On occasions such as Commencement, etc., the "mortar-board" is not as a rule removed from the head except (1) at the invocation of the Divinity; (2) during the singing of hymns, and (3) when the Provost is addressed. It may, however, be removed at times other than those specified. The Provost, Vice-Provost and Deans of Faculties, although permitted under the regulations to wear badges distinctive of their several offices, do not do so. It is customary, however, for professors or others who may have been the recipients of foreign decorations to display the insignia on the left breast of the gown.

Caps and gowns are not worn by the undergraduates, except by the Senior Class during the last term of the Senior year. This action, however, is wholly voluntary, and depends upon class vote; some classes wearing cap and gown throughout the term, while others do not wear them until Class Day. The gown worn is of the standard baccalaureate pattern, with long, pointed sleeves.

Appended is a verbatim copy of the present statute:

SECTION I.—The following described academic costume is ordered to be worn upon all appropriate occasions, as indicating the several degrees and the faculties to which they pertain:

GOWNS: (1) Pattern: those commonly worn, with pointed sleeves for the Bachelor's degree; with long, closed sleeves for the Master's degree; and with round, open sleeves for the *Doctor's degree. (2) Material: worsted stuff for the Bachelor's degree; silk for the Master's and Doctor's degrees. (3) Color: black. (4) Trimmings: for the Bachelor's and Master's degrees, the gowns are to be untrimmed. For the Doctor's degree, the gown is to be faced down the front with black velvet, with bars of the same across the sleeves; or the facings and crossbars may be of velvet of the same color as the binding or edging of the hood (see below), being distinctive of the faculty to which the degree pertains.

HOODS: (1) Pattern: the pattern usually followed by colleges and universities, save as modified below. (2) Material: the same as that of the gown. (3) Color: black. (4) Length: the length and form of the hood will indicate the degree, as follows: for the Bachelor's degree, the length shall be three (3) feet; for the Master's degree, the length shall be four (4) feet; and for the Doctor's degree, the length shall be the same [*i. e.*, four (4) feet], but shall have panels at the sides. (5) Lining: red and blue silk, arranged in the form of a chevron. (6) Trimmings: the binding or edging to be four (4) inches in width, of silk, satin, or velvet, the color to be distinctive of the faculty to which the degree pertains, thus Faculty of Arts and Letters, white; Faculty of Science, gold yellow; Faculty of Music, pink; Faculty of Theology, scarlet; Faculty of Philosophy, dark blue; Faculty of Law, purple; Faculty of Medicine, green; Faculty of Dentistry, lilac; Faculty of Veterinary Medicine, gray.

CAPS: The caps shall be of the material and form generally used, and commonly called "mortar-board" caps. The color shall be black. The Doctor's cap may be of velvet. Each cap shall be ornamented with a long tassel attached to the middle point at the top. The tassel of the Doctor's cap may be, in whole or in part, of gold thread.

SECTION II.—Members of the faculties, and any person officially connected with the University, who have been recipients of academic honors from other universities and colleges in good standing, may assume the academic costume corresponding to their degree, as described in the foregoing section; *provided that* such right shall terminate if such persons shall cease to be connected with the University. The Provost, Vice-Provost and Deans of Faculties may adopt distinctive badges, not inconsistent with the costume hereinbefore described.

J. HARTLEY MERRICK.

*In all cases when the *Doctor's* degree is mentioned, reference is made ONLY to degrees in Philosophy, Divinity, Letters, Music, Science, or Laws. Holders of the degrees *Doctor of Medicine*, *Doctor of Dental Surgery*, *Doctor of Veterinary Medicine*, will wear gowns and hoods similar in all respects to those prescribed for *Bachelors*.

PROCEEDINGS OF THE CORPORATION.

At a stated meeting held on Friday, May 2, the following business was transacted :

The Dr. Edward Rhoads Memorial Children's Bed was established in the University Hospital, and thanks were voted to Dr. James Tyson for his efforts in collecting the necessary funds. The Architectural Staff was requested to prepare a general plan of landscape ornamentation with reference to the campus and adjacent grounds. Thanks were voted to the Milwaukee Alumni for recent courtesies; to the donors of funds and books; and also to the donor of the funds to equip a women's gymnasium at Thirty-ninth and Locust streets. The titles of certain chairs were ordered changed, as follows: that of General Pathology and Morbid Anatomy, to Pathology; of Mathematics and Astronomy, to Astronomy; and that of Hygiene, to Hygiene and Bacteriology. The following appointments were confirmed: Edgar F. Smith, Ph. D., as Vice-Provost *pro tempore* of the University; Messrs. Wood, Smith, Lewis and Sims, as Trustee representatives on the Board of Managers of the University Hospital; Messrs. Boardman, Furness, Wood, Penniman, Newbold, Lamberton, Conklin, Brumbaugh; and Meses. Bennett, McMurtrie, Dechert, McMaster and Schelling, as Managers of the Graduate Department for Women. Certain additional Fellowships and Scholarships were established in the Department of Philosophy for the year 1899-1900.* The offer of Mr. Joseph W. Gross to erect a memorial tablet in the new Law School building to the late Algernon Sydney Biddle was accepted with thanks. A proposal from the College Class of 1898, to establish an annual gold medal to be known as the "Charles Ingersoll Hutchinson Memorial Medal," in memory of their deceased classmate, was accepted unani-

*A complete list of these appointments will appear in the June issue of the BULLETIN.

mously, and the thanks of the Corporation were ordered to be returned to the donors.

Action in the matter of prizes was taken as follows: (1) In future no prizes of a less value than \$50 to be accepted by the Corporation; (2) all prizes which have already been accepted by the Corporation, including those of a less value than \$50, shall continue to be published as heretofore in the Catalogue; (3) the names of all prize winners shall be published as heretofore in the appendix to the Commencement programme and in the University Catalogue; (4) the names of prize winners shall not be announced by the Deans on Commencement Day; (5) these provisions relating to prizes shall apply to the Fellowships and Scholarships in the Department of Philosophy.

LECTURES BY M. EDOUARD ROD.

A course of four lectures was delivered at the University last month by M. Edouard Rod, the well-known novelist, essayist and critic, until recently professor in the University of Geneva, and at present editor of the "*Revue Contemporaine*" published in Paris.

The aim of the course was to present French tragedy from its origin to its highest artistic development as embodied in *Athalie*, Racine's sublime masterpiece. A subject like this would not, at least not usually, attract large audiences to our lecture-halls, because the appreciative enjoyment of that phase of French literature presupposes a fairly thorough familiarity with the French language; and some acquaintance, at least, with the dramatic productions of the period involved. Lectures upon the more modern phases of French literature deal with subjects and writers that are nearer to the majority of lecture-goers. Victor Hugo, for instance, or Balzac, whose writings have all been more or less well translated into English, are now names familiar to every educated American. The vast critical labor of Sainte-Beuve, and, in our own day, the keen and comprehensive work of Brunetière as a literary critic and essayist,

begin to be more truly appreciated; while it is a significant fact that the latter's manual of the History of French Literature was published last year almost simultaneously in French and English.

The foundation of a "Cercle Français" at Harvard University a few years ago has greatly deepened the interest in French literature, and stimulated the intelligent study of the literary life of one of the world's most enlightened nations; and the foundation of a similar "Cercle" at this University is now an accomplished fact. There is little doubt that without M. Rod's course our own "Cercle" would not have come into existence at this time; and that for this reason, if for no other, he is entitled to the gratitude not only of those who heard his lectures, but of all interested in the study of the French language and literature.

The following is a brief summary of the course, which began March 29 with a lecture on "The Origin of French Tragedy."

In studying French tragedy the fact must be noted that it did not spring from the old national drama, and that it was not influenced by the medieval religious drama, but that it came from pagan myths and from the Greek tragedy. As early as 1561, Scaligerus defined tragedy thus: "The imitation put into action of an illustrious event, with a sad *dénouement*, in lofty style and in verse."

The first author of tragedies in French was Etienne Jodelle. He was a drunkard and vagabond, and his plays, as well as those of his contemporaries, were crude and insignificant. The most popular dramatist of that age was Garnier (1534-1590?). He wrote eight plays which went through forty editions. Among his successors may be mentioned Claude Billard and Antoine de Montchrétien. The first playwright *by profession* was Alexandre Hardy (1570-1632?) who, as the official playwright of the King's troupe, wrote over six hundred plays largely in imitation of the Spanish romantic dramas. He has, therefore, no original merit, but deserves credit for freeing the French drama from Greek tragic forms.

Among other dramatists of that time the most important position was occupied by Jean de Rotrou, who had poetic force and fire. The advances made in the French drama at this

point are shown especially in the development of the plot; but the age being one of eloquence, it is only natural that the style of the drama should be oratorical and declamatory. It is, however, to be noted that the subjects presented involve psychological problems and character-studies. The development of French tragedy has been connected intimately with the historical and social growth of the country: having been created for an aristocratic society, it would be out of place in the democratic world of to-day; in fact, it exists no longer.

In his second lecture M. Rod spoke on Corneille's *Cid* and its far-reaching influence. The *Cid* was first produced in 1636. Its success was phenomenal and, as one of Corneille's enemies admitted, *it brought more money to the company than the ten best plays put together had ever done before*. The quarrel of the *Cid*, Cardinal Richelieu's hostile attitude toward the author and his play, largely due to his personal jealousy as an author—these are all matters of literary history. The play was submitted to the French Academy, Richelieu's own creation, and the verdict of that literary supreme court was such as to leave open the question whether the play was composed in accordance with the laws of dramatic art as then understood. It is, however, easy to see that the *Cid* was written in defiance of those laws, and subject and hero both, as well as the Spanish play after which it was fashioned, were unclassical. The hero—a barbarian of the eleventh century, a faithless, cruel and brave adventurer—had in the Spanish play become a noble-hearted, saintly knight. To discuss the subject of the play would occupy too much of the space allotted to this brief summary; but it must be stated that Richelieu's enmity was partly due to his dislike for everything Spanish, to his lifelong struggle for national unity in France and for the destruction of the feudal system, as well as for the abolition of the duelling mania so prevalent in that age. It is interesting to observe that the Spanish heroes were nightly applauded on the stage while France was at war with Spain.

In the third lecture M. Rod dealt with Racine, whom he considers one of the greatest poets that ever lived. He differed essentially from Corneille, whose tragedy was really a sort of heroic poem, representing great historical characters

struggling against their own passions. Racine transformed the heroic into a pathetic poem, with *love* for its object.

Corneille himself declared that Racine was unfit to write dramas, and Madame de Sévigné accused him of writing plays not for posterity, but for his favorite actress. In order to silence his critics Racine produced a comedy, *Les Plaideurs*, and a typical tragedy, *Britannicus*, the play which embodies most completely the idea of tragedy as understood by Racine. This, as well as his subsequent tragedies, are in perfect accord with the very temperament of France during the seventeenth century, which was determined by the Cartesian system. René Descartes, in his "Treatise on the Passions," insisted that all passions could be overcome by the will, if men would only make a proper study of themselves. Thus the object of literature was held to be the minute study of human passions, and Racine endeavored to show the fatal results following from the rule of the passions over the will. In *Britannicus* Racine presents the emperor Nero while still struggling between his best and his basest instincts. He finally yields to his evil passions, and in his own downfall he crushes the two characters which have aroused our sympathy, Britannicus and Junia.

In the subsequent plays of Racine's first dramatic period he gave many more faithful portrayals of passion, but eventually he became his own severest critic; and when at the height of fame he renounced playwriting for many years.

His conversion and the great final triumph which he achieved with *Athalie*, the ideal religious drama, formed the subject of the fourth lecture. It was shown how Racine, brought up in the religious atmosphere of Port Royal, was really never satisfied with the easy and dissipated life of the playwright. He tried to show that his plays incited the spectator to virtue, and in his preface to *Phèdre* he insisted that "he had never pleaded the cause of virtue as strongly as in this play." However, he soon made his peace with his old teachers and friends of Port Royal, and was barely dissuaded from going into a monastery. Eventually he took up the pen again, and gave to France two religious tragedies, *Esther* and *Athalie*, the latter of which remains as the maturest expression of this poet's chastened soul. It was first produced privately before the king,

and met with severe criticism from all except Boileau, who regarded it as Racine's masterpiece. Later critics went even further: Voltaire pronounced it to be "one of the masterpieces of the human mind;" and Schlegel says that *Athalie* is not only Racine's most perfect work, but of all French tragedies the one that comes nearest to the sublime style of the Greek tragedies. A unique and divine inspiration animates this play throughout, and in itself proves the sincerity of the poet's feelings." This tribute of the German critic is the more noteworthy, because foreigners have never understood French tragedy: Lessing has frequently attacked it, Goethe has followed him; and both have considered it the acme of artificiality. But, curiously enough, the very narrowness of certain rules may sometimes help to create works of matchless beauty, of wonderful cohesion and solidity. Here is a play, centred in one event, compressed within a period of twenty-four hours, limited to one place, and yet—the episode which makes the whole play is of the highest importance: it deals not only with the fate of a few individuals, but with the very destiny of the people of God. Will this people remain the slave of pagan rulers and their idols; or will it regain hold of itself and return to the true God—that is the subject of the drama.

In conclusion, the lecturer in analyzing the impressions produced by *Athalie*, recalled those made by some of Wagner's later works, especially by *Parsifal*. These two great artists, so different in themselves, using different means, have yet attained the same result: Wagner, with all the inexhaustible wealth of musical harmony and the splendor of scenic art; Racine with the narrow forms of classical tragedy and Alexandrine verse. That, in spite of this, *Athalie* is such a truly great work of art sufficiently proves its author's genius, which was great and above the limitations of his age and of literary form.

Much as these four lectures were enjoyed by the large audiences that filled the College Chapel, it must be said that the fifth—a complimentary lecture—on Cyrano de Bergerac, aroused genuine and well-deserved enthusiasm. Lack of space forbids even a brief summary of this interesting lecture, and it must suffice here to say that, both in point of critical acumen and literary style, it was even better than those which preceded.

S. P. MOLENAER.

**TWO NEW SPECIAL COURSES: IN SOCIAL WORK; AND IN
COMMERCE, DIPLOMACY AND INTERNATIONAL LAW.****SOCIAL WORK.**

The growing public interest in sociology, and in the social sciences generally, has caused a demand for instruction in these subjects on the part of many persons who can give to systematic study less time than that required by a complete college course, but who, nevertheless, desire a training in scientific methods not supplied by the ordinary public lecture. The University has therefore decided to establish a special two-year course, beginning next term, which does not lead directly to a degree, but which furnishes a convenient grouping of the major part of the instruction the University has to offer in these subjects.

Educational and philanthropic societies are seeking trained men as superintendents, secretaries and responsible officers. They recognize that such positions can no longer be properly filled by those not thoroughly familiar with social movements, or by those not intimately acquainted with the foundation theories of social forces.

The clergyman of to-day has need of a knowledge of the social and economic problems of our times, and of a training in correct habits of observation and in sound reasoning on these topics. This is already recognized by the leading religious denominations of the country, and the best theological seminaries are trying to furnish opportunities for work in the social sciences.

The object of this course in social work is to focus the best equipment of the University so as to provide for diligent students, at a minimum expense of time and money, a part of the necessary training for either of these two careers. Even those of maturer years—the busy clergyman, business or professional man, who could perhaps pursue only a part of the course here outlined, will find in these subjects and in these methods of study a training in the ideals of citizenship. In common with other courses offered by the University, it aims to prepare for large public usefulness and to stimulate a high sense of public duty and responsibility. The lectures in several

of the topics are arranged to come in the late afternoon hours, and may be taken separately by partial students.

The formal instruction consists of lectures, assigned reading and essays to be prepared by the students. In the course of public lectures, students will come into personal contact with active workers, prominent clergymen, and leaders in several lines of charitable and educational work. Opportunities will be offered to engage in practical efforts in local charities, social settlements, city missions, etc., under the supervision of an instructor. Class visits will be made from time to time to local institutions.

The full course contemplates sixteen hours of instruction per week in each year, ten hours of which in the first year and eight hours in the second year are required work, the remaining hours being chosen by the student from a wide range of electives. The required courses comprise three in sociology, dealing with such subjects as ancient and modern social ideals; the character, development and economic antecedents of social institutions; the factors in social evolution; national character; theories of prosperity; significance of social classes; the social reformers and methods of reform in the nineteenth century; and the theory and practice of charities and correction. Three courses treat of economics and political economy; three with politics, governmental administration and international law; and one with statistics.

The new special course attempts to combine, so far as possible, the elements necessary for a thoroughly practical training with a drill in the theory of the social sciences.

COMMERCE, DIPLOMACY AND INTERNATIONAL LAW.

Beginning with the academic year 1899-1900, a two-year special course in commerce, diplomacy and international law will be instituted, with a view to meeting the growing demand for well-trained men in the public service and in commercial life.

The new political responsibilities which the country has been called upon to undertake call for a corps of experts in the con-

sular and diplomatic service, who must have had previous training by a systematic course of study in such subjects as diplomatics and international law, commercial relations with foreign countries, history of trade and exchange, etc. The requirements of the service are such as to exclude from it men whose preparatory training does not fit them to handle the complex questions arising in our foreign relations, especially in connection with such portions of the world as South America and the Far East, where so much depends upon official discretion. The maintenance of cordial political relations depends in large measure upon the education and ability of our representatives.

The search for new markets that has accompanied our recent commercial expansion has given rise also to a demand for capable representatives in all parts of the world. The peculiar conditions governing trade in those countries in which commercial opportunities are greatest, make it necessary to supplement the ordinary business training with technical instruction in those branches of law and diplomatics with which the commercial agent most frequently has to deal.

The course as established covers two years of instruction, and will be open to those applicants who can satisfy the College Committee on Special Students as to their preparation to undertake the work.

In arranging the subjects of study for each year the need of direct preparation for the practical work of consular or commercial agents has been kept in mind. Students completing the two years' work will thus be able to take immediate advantage of the new opportunities which the changed conditions of our industrial and political life have developed. The topics of study for each year are as follows:

First Year.—American diplomacy; American commercial relations; international trade and foreign exchange; race traits and distribution; economic resources of European countries; constitutional law.

Second Year.—International law; European commercial relations; diplomatic history of Europe; government of colonies and dependencies; economic resources of the Far East; comparative constitutional law, jurisprudence, political economy; public finance.

THE GERMANIC ASSOCIATION.

The Germanic Association, which includes the officers of instruction and the post-graduate students of the Germanic Department of the University, has held regular meetings during the academic year. The following papers have been presented:

1. *The Syntax of the Milstatt Genesis* (thesis subject), by C. W. Prettyman.
2. *The Probable Source of Canitz's Eighth Satire "der Hoff,"* by C. W. Prettyman.
3. *The German Influence in Charles Brockton Brown's "Wieland,"* by M. D. Learned.
4. *A Low-German Ballad, commemorating the Siege of Göttingen,* by D. B. Shumway.

The May meeting of the Association was made the occasion of extending an invitation to Director Heinrich Conried, of the Irving Place (German) Theatre, New York City, to address the members of the Association and the public in Houston Hall on the afternoon of May 3. The subject of the lecture was "The German Stage," and the speaker outlined carefully and entertainingly the points of similarity and contrast in German and American theatre management. After the lecture an invitation was extended to the audience to inspect the Bechstein Collection of Germanic works in the University Library.

On the same evening Director Conried was tendered a dinner by the Germanic Department at the Faculty Club, to which invitations were extended to about thirty prominent German citizens of Philadelphia and vicinity. The principal subjects of discussion during the evening were the lecture of the afternoon, and a reprint from Vol. II, No. 4, of *Americana Germanica*, the title of which is "History of the German Drama in America." The treatment of this subject includes the following features:

- (a) *The Imported German Drama on the German Stage in America.*
- (b) *The Imported German Drama on the English Stage in America.*
- (c) *The Literary Influence of the German Drama in America.*
- (d) *The German Drama Written in America.*

With a view to furthering the publication of such results in appropriate form, Director Conried made the generous offer of two benefit performances by his New York Company, to be given in Philadelphia during the season of 1899-1900, at whatever time and place might seem most desirable. The offer was unanimously accepted, with the cordial thanks of the Germanic Department; and was subsequently accepted by the Provost in the name of the University.

Dr. C. J. Hexamer, of Philadelphia, urged strongly the formation of a national subscription among Germans in America, for the establishment of a permanent publication fund for a like purpose. This proposition was also adopted, and definite plans are now under consideration to form a National Committee on the Publication Fund for the History of German Culture in America.

Various phases of research work on the German Drama in America will be presented at the meetings of the Germanic Association during the academic year of 1899-1900; and a seminary course on the "Beginnings of the Drama in Germany," will also be offered in the spring of 1900.

THE GRADUATE BIOLOGICAL CLUB.

On the evening of January 16, 1899, Mr. Howard Crawley presented the results of some work done on absorption in vertebrate intestinal cells. He described the appearance of the goblet cells of the intestine, which do not have absorptive functions, and the cylinder cells, which have to do with absorption. Dr. S. C. Schmucker made a communication on the introduction of the San José "scale" into Pennsylvania, in which he referred to the geographical range of this pernicious insect, and to its life-history and reproductive powers.

The evening of February 6, 1899, was devoted to the consideration by Dr. T. H. Montgomery of those birds which are suitable to the confined life of a vivarium; to a paper by Dr. A. Ferree Witmer on involution as a cause of disease; and to an exhibition by Dr. J. W. Harshberger of a number of photographs of historic trees growing in Mexico and California. Dr.

J. M. Macfarlane also displayed and referred to the morphology of some tricarpeal walnuts, which he had received from Mr. Aldrich Pennock, of Lansdowne.

At the meeting held on February 20, Dr. Macfarlane reviewed a number of recent papers on cytological subjects. One of the most interesting of these papers was one by Wager, "On the Nucleus of the Yeast Plant." By special care in preparation and study, Wager found that the structure of the yeast cell was more complex than had formerly been supposed, and that the nucleolus was an important factor. Dr. J. P. Moore displayed a large number of lantern slides of fishes suitable for aquaria, and commented upon their structures and life-habits.

Miss Louise Nichols, on March 6, described a trematode worm parasitic upon the catfish. The worm, called scientifically *Gyrodactylus elegans*, inhabits especially the neighborhood of the gills and gill covers of certain fishes. Dr. P. P. Calvert, at the same meeting, spoke at some length upon the illuminating organs of fireflies, and of phosphorescence in general. Dr. Calvert stated: (*a*) that the light-giving material of fireflies is independent of cell life; (*b*) that it is due to the presence of oxygen; (*c*) that the phosphorescence does not depend upon the proximity of the tracheæ.

At a meeting held on March 20, 1899, Miss Jennie F. Waddington reviewed a number of recently published papers on the fungi. Dr. E. G. Conklin, by means of the lantern, exhibited and at the same time described certain types of amphibia (frogs, salamanders and toads), which might be kept in confinement. Dr. Harshberger displayed and commented upon the morphology of a number of plants, among them the peanut, cedar of Lebanon and oriental green hellebore.

On April 17, a discussion of the mental factors which tend to modify simple reflexes was started by Dr. Lightner Witmer, who presented a synopsis of recent work in the laboratory. Mr. J. R. Murlin presented the results of some detailed work upon the aggregation phenomena in connection with the movement in sensitive plants. Miss Caroline B. Thompson also described some material obtained in a collecting trip taken to Sea Isle City, N. J.

At a meeting held May 1, Dr. H. A. Pilsbry, of the Academy

of Natural Sciences, described some recent discoveries made by him in the distribution of the muscles of certain land snails. Dr. J. W. Marshberger showed a number of leguminous plants, and commented upon the tubercles and domatidial spines formed upon them. Dr. Henry Kraemer, of the Philadelphia College of Pharmacy, described in some detail peculiarities in the structure of native and foreign violets, illustrated by enlarged sketches of certain mucilage cells, hairs and staminal spurs.

The last regular meeting was held on May 15, when the following programme was carried out: (1) a review on Bathmism by Mr. Howard Crawley; (2) Mr. S. L. Shumo gave botanical and zoological notes on an excursion to Guatemala; (3) Mr. Harry Fox traced the development of the tympano-eustachian tube of the toad, and illustrated his observations with slides and drawings.

ABSTRACTS OF RECENT PAPERS.

The Storm Gods in the Rig-Veda.

LEE MALTBIE DEAN.

[Read before the Language Union, April 10, 1899.]

In the Rig-Veda there are many hymns which vividly portray the divine power of the Vedic deities as displayed in the rage of the elements. Among such deities is Parjanya, the thundering rain god, who pours down the rain in floods and fructifies the whole earth. The god Varuna possesses general cosmical functions, and less frequently is represented, like Parjanya, as a god who pours down the rain. The Maruts are more specifically lightning gods, and quite a large collection of hymns is given to their celebration. These hymns abound in brilliant imagery and are among the most interesting in the Rig-Veda.

The Body and Allied Themes in the Sankhya.

MORTON W. EASTON.

[Read before the Language Union, May 2, 1899.]

The paper discussed certain tenets of the Sankhya philosophy, with the purpose of explaining their nature by means of a comparison with some religious and scientific conceptions of our own time. The exposition, partly familiar in tone and copious in detail, cannot be fairly presented

in an abstract. Certain parallelisms between the Hindoo and the modern notions were pointed out, and the author attempted to show that whatever adverse criticism, especially in point of obscurity, can be brought against the former, is often equally applicable to the latter also.

Many obscure tenets of ancient philosophies of this type can be said to be understood by us, not because we have found that they are tenable, or in some cases, even expressive of anything really intelligible: but because we find that they are logically deducible from other positions or formulæ, or because we are able to detect the precise nature of what is perhaps only a verbal quibble; or to point out just what influences led the philosopher to use just the words he did; or, as already indicated, when we become conscious that we ourselves have similar conceptions perhaps as obscure, as contradictory and even as perverse, when we think of similar things.

If we have gained some of these points of view, we may assert that we understand, in part, but we shall fail to do justice to a particular system, unless we at the same time measure it as we must our own religious faith, by its influence over the men who hold it. And, in detail, we must learn to neglect, in determining the character of the system as a whole, certain inconsistencies and logical *tours de force* due to the attempt to find some place in its formulæ for inherited vaticinations; such, for instance, as much that the Hindoo found in the older literature and had to take into account. For instance, it is possible to regard the belief in a period of *pralaya* as inconsistent with the fully developed metaphysics of the Sankhya. We, at the present day, have had sufficient experience of such hampering conditions.

In any event, whatever the nature of the theme, or of its treatment, it is quite certain that our comprehension will not be one whit clearer than is our understanding of somewhat similar questions in our own individual philosophizing. If we are wont to imagine that we have attained clear conceptions as to the difference between matter and spirit, we shall find some difficulty, perchance, in determining, for instance, whether the Sankhya is or is not materialistic in tendency. Little that is profitable will result from the application of inexact standards of measurement to illy defined conceptions, and we may easily misrepresent the nature of the system studied.

Furthermore, in attempting to describe the tenets of the Sankhya, one will meet with scant success if he confines himself to the English religious and philosophical vocabulary. This is a borrowed one, and there is no good reason why we English, at any rate, should not adopt a like procedure in dealing with the Hindoo philosophy. The Sanscrit terms should be transferred. The notions to be conveyed are so different from those expressed by our technical terms, especially when used accurately, that the latter either convey no meaning at all, or one that is altogether misleading. The full definitions, which will be necessary in any case, will be greatly facilitated if the Sanscrit terms can be used in full conscious contrast with our own.

**CURRENT MEDICAL PERIODICALS AT PRESENT RECEIVED IN THE
UNIVERSITY LIBRARY.***

- American Climatological Association—Transactions.
American Journal of Insanity.
American Journal of the Medical Sciences.
American Journal of Pharmacy.
American Journal of Physiology.
Archiv für Experimentale Pathologie und Pharmakologie.
Archiv für Pathologische Anatomie, Physiologie und für
Klinische Medicin.
Archiv für Psychiatrie.
Archives de Medicine Experimentale et d'Anatomie Path-
ologique.
Archives of Neurology and Psycho-Pathology.
Berliner Klinische Wochenschrift.
Berliner Thierärztliche Wochenschrift.
Boston Medical and Surgical Journal.
British Medical Journal.
Bulletin of the American Academy of Medicine.
Bulletin of the Johns Hopkins Hospital.
Bulletins et Mémoires de la Société Anatomique de Paris.
Centralblatt für Allgemeine Pathologie und Pathologische
Anatomie.
Centralblatt für Bakteriologie, Parasitenkunde und Infec-
tionskrankheiten.
Centralblatt für Innere Medicin.
Centralblatt für die Medicinischen Wissenschaften.
College of Physicians of Philadelphia—Transactions.
Comptes Rendus Hebdomadaires des Séances de la Société
de Biologie.
Congress of American Physicians and Surgeons—Trans-
actions.
Deutsche Medicinische Wochenschrift.

* Publications of Health Departments not included.

The complete list of the University's collections in Medical periodical literature will appear in the "Union List of Periodicals in the Libraries of Philadelphia," which is now in course of preparation.

Index Medicus.
International Dental Journal.
Journal of American Medical Association.
Journal of Experimental Medicine.
Journal of Nervous and Mental Diseases.
Journal of Osteopathy.
Journal of Pathology and Bacteriology.
Lancet.
Medical News.
Medical and Surgical Reporter.
Medical Record.
Medical Society of Pennsylvania—Transactions.
Medical Society of New Jersey—Transactions.
Mittheilungen aus der Medicinischen Facultät der Kaiserlich—Japanischen Universität zu Tokio.
Münchener Medicinische Wochenschrift.
New York Medical Journal.
Pediatrics.
Philadelphia Medical Journal.
Philadelphia Polyclinic.
Proceedings of the Pathological Society of Philadelphia.
Royal Academy of Medicine in Ireland.
Schmidt's Jahrbücher der In- und Ausländischen Gesamten Medicin.
La Semaine Médicale.
University Medical Magazine.
Upsala Läkareförenings Förhandlingar.

Publications

OF THE

University of Pennsylvania

Group I.—Annual Publications.

University Catalogue (published in December).

Fasciculi of the Departments of Philosophy (Graduate School), Law, Medicine, Dentistry and Veterinary Medicine; also Circulars of Information concerning courses offered in the College, as follows: Illustrated Descriptive Circular; **A**, Admission to College; **B**, Arts and Science; **C**, Finance and Economy (Wharton School); **D**, Biology; **E**, Music; **F**, Teachers' Courses; **G**, Architecture; **H**, Mechanical Engineering; **I**, Electrical Engineering; **K**, Civil Engineering; **L**, Chemistry and Chemical Engineering; **M**, Social Work; **N**, Commerce, Diplomacy and International Law.

Report of the Provost (published in January).

Group II.—Serial Publications.

Series in Philology, Literature and Archæology.

Series in Philosophy.

Series in Political Economy and Public Law.

Series in Botany.

Series in Zoölogy.

Series in Mathematics.

Series in Hygiene.

Series in Astronomy.

University Bulletin (monthly).

Group III.—Occasional Publications.

Reports of the Museums of Archæology and Paleontology.

Theses presented for the Degree of Doctor of Philosophy.

**Group IV.—Affiliated Publications.*

Annals of the American Academy of Political and Social Science.

Americana Germanica (quarterly).

Translations and Reprints from the Original Sources of European History (occasional).

American Law Register (monthly).

EXPLANATORY.

Group I consists of publications issued annually under the direct auspices of the Provost and Trustees.

The University Catalogue is a volume of about 500 pp. It contains detailed information concerning all departments, lists of officers and students, with addresses, etc. No charge is made for the Catalogue, but in all cases requests for a copy by mail must be accompanied by ten cents in stamps to cover postage.

* For exchange purposes only.

The Fasciculus of each department contains information concerning that department *only*; while the lettered Circulars of Information, covering the several courses offered in the College, are in like manner restricted as to their contents. The Fasciculi and College Circulars are published separately after the University Catalogue, the Fasciculi being practically reprints from the Catalogue. Single copies are mailed free upon request.

The Report of the Provost, made by him annually to the Corporation, constitutes a general review of University activities during the year, and contains *inter alia* reports from the Treasurer and the several Deans. Single copies are mailed free upon request.

Group II consists of a number of serial publications in the several fields of literature, science and philology. They are issued in separate series at irregular intervals (for the most part), and represent the results of original research by, or under the direction of, members of the staff of instruction of the University. A complete list of these publications to date, *with prices attached*, is printed at length following. They are published under the supervision of the University Publication Committee.

Group III consists of occasional publications, such as reports of the various University departments (where printed separately), and certain theses presented in partial fulfillment of the requirements for the degree Doctor of Philosophy.

Group IV consists of affiliated publications, issued as separate periodicals, not under the control of the University, but edited in part by officers of the University of Pennsylvania. Copies are obtainable only through the medium of exchange (see below).

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The University of Pennsylvania desires to extend its system of exchanging publications with other similar institutions and learned societies, both at home and abroad.

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Philology, Literature, and Archæology

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1. **Poetic and Verse Criticism of the Reign of Elizabeth.** By FELIX E. SCHELLING, Professor of English Literature. \$1.00.
2. **A Fragment of the Babylonian "Dibbarra" Epic.** By MORRIS JASTROW, JR., Professor of Semitic Languages. 60 cents.
3. *a. Πρὸς with the Accusative. b. Note on a Passage in the Antigone.* By WILLIAM A. LAMBERTON, Professor of the Greek Language and Literature. 50 cents.
4. **The Gambling Games of the Chinese in America: Fán t'án and Pák kòp piú.** By STEWART CULIN, Curator of the Museum of Archæology and Paleontology. 40 cents.

Volume II.

1. **Recent Archæological Explorations in the Valley of the Delaware River.** By CHARLES C. ABBOTT, Sometime Curator of the Museum of American Archæology. 75 cents.
2. **Observations on the Platform Persepolis.** By MORTON W. EASTON, Professor of English and Comparative Philology. 25 cents.
3. **The Articular Infinitive in Demosthenes.** By WILLIAM A. LAMBERTON, Professor of the Greek Language and Literature. (*In preparation.*)
4. **The Life and Writings of George Gascoigne.** By FELIX E. SCHELLING, Professor of English Literature. \$1.00.

Volume III.

1. **Assyriaca.** By HERMANN V. HILPRECHT, Professor of Assyrian and Comparative Semitic Philology, and Curator of Babylonian Antiquities. \$1.50.
2. **A Primer of Mayan Hieroglyphics.** By DANIEL G. BRINTON, Professor of American Archæology and Linguistics. \$1.20.

Volume IV.

1. **Readings in Gower.** By MORTON W. EASTON, Professor of English and Comparative Philology. 60 cents.

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3. **The War of the Theatres.** By JOSIAH H. PENNIMAN, Instructor in English. \$1.00.

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Philosophy

1. *** Sameness and Identity.** By GEORGE STUART FULLERTON.
2. *** On the Perception of Small Differences.** With special reference to the Extent, Force, and Time of Movement. By GEORGE STUART FULLERTON and JAMES MCKEEN CATTELL.

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The Publication Committee of the University of Pennsylvania announces the early issue of the following monographs in the several University Series. When published, they will be placed on sale through the agency of Messrs. Ginn & Co., Tremont Place, Boston, Mass.

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By RAYMOND MACDONALD ALDEN, Ph. D., Senior Fellow in English.
(In preparation.)

La Ingratitud Por Amor (Comedia de Don Guillen de Castro). By

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Palatalization in the Old English Dialects. By CLARENCE G. CHILD,
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Hindu Logic as Preserved in China and Japan. By SADAJIRA SUGIURA,
Ph. D. (In preparation.)

SERIES IN

Political Economy and Public Law

The Philadelphia Negro: A Social Study. By WILLIAM E. BURKHARDT DUBOIS, Ph. D., Assistant in Sociology, 1896-97. (In press.)

Railway Co-Operation in the United States; Its Evolution and Its Needs. By CHARLES S. LANGSTROTH B.S. in Econ., and WILSON STILZ, B.S. in Econ. (Two monographs. In press.)

SERIES IN

Philosophy.

Spinozistic Immortality. By GEORGE STUART FULLERTON, Ph. D., Professor of Intellectual and Moral Philosophy. (In press.)

SERIES IN

Astronomy.

Vol. I—No. 1. (In Preparation.)

**Description and Determination of the Longitude of the Flower
Astronomical Observatory.** By CHARLES L. DOOLITTLE, C. E.,
Sc. D., Director, and Professor of Astronomy.

Vol. I—No. 2. (In Press.)

**Results of Observations with the Zenith Telescope, from October
1, 1896, to August 16, 1898.** By CHARLES L. DOOLITTLE, C. E.,
Sc. D., Professor of Astronomy.

SERIES IN

Botany.

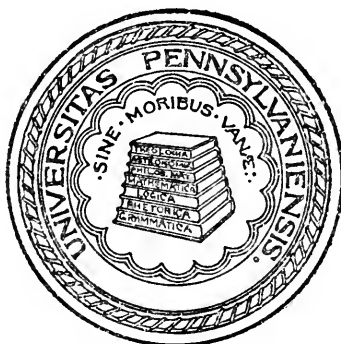
Vol. II—No. 1. (In press.)

- a. Observations on Conopholis Americana.* By LUCY L. W. WILSON, Ph. D., Head of the Biological Department, Philadelphia, Normal School for Girls.
- b. Recent Observations on Amphicarpæa Monoica.* By ADELINE F. SCHIVELY, Ph. D., Honorary Fellow in Botany.
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Publications
OF THE
University of Pennsylvania

University Bulletin.

Volume III. Number 9.



Founded 1740

Issued Monthly During the Academic Year.

PHILADELPHIA:
PUBLISHED FOR THE UNIVERSITY OF PENNSYLVANIA.

JUNE, 1899.

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Commencement, 1899



Programme

Procession

Graduating Classes, Members of Faculties, Trustees,
Invited Guests, Honorary Chaplain and Orator of
the Day, the Vice-Provost, the Provost.

Invocation Rev. Joseph May, LL. D.

***Hymn**—"Our Father in Heaven"

Commencement Address Hampton L. Carson, Esq.

***Hymn**—"Hail! Pennsylvania"

Conferring of Degrees in Course

Conferring of Honorary Degrees

***National Anthem**—"America"

Benediction



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and National Anthem, copies of which are included in this Programme.

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 Edward Dunn Brown
 William Rawle Brown
 Frederic Lewis Clark
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 Horace Hugh Francine
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 Winthrop Cunningham Neilson
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 Samuel Canby Rumford
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Bachelor of Science in Architecture

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John Hugh Vincent Bache	Arthur Barton Crane
Harry Clark Baker	Howard Besson Cressman
Arthur D'Alanson Barber	Carl Douglass Crooks
Walter William Barton	James Francis Cush
Andrew Holman Baxter	Lewis Williams Darlington
Willson Edwards Beattie	Hardin Davis
Leon Berlau	Matthew Thompson Dill
Burton Frederick Bishop	J Warren Dilworth
Gerardus Hendrikus Bisseling	Dudley R Dudley
James Harper Black, Jr.	Michael Alfred Duffy
Willy Blattmann	Harry Dunlop
Charles Pratt Blinn	Charles Michael Dunne
Edwin Schuyler Bodle	Chauncey Field Egel
Salvador Bravo	Zacarias Esponda
John Aston Brooks	George Sturges Essig
Edward Pleasanton Burnham	Wilbur Edwin Evans
Roy Allen Bush	Henry Penrose Feldman
Frederic H Camp	Carleton Americus Fletcher
Harold Cardwell	Charles August Forsbeck
Eric Adelbert Cecil Caro	John Cubberly Forsyth
José Lorenzo Casaldue y Goicoechea	John William Freeston
Clarence Hollinshead Chain	John Kales Freiot
Moon Hung Chaun	John Gordon Fulton
Frank Wagner Clinger	Francis Xavier Galen
Robert Alexander Comegys	Alric Garland
William T Conard	John Rice Gibbs, Jr.
Thomas Joseph Conlon	Reginald Leslie Gooding

Doctor of Dental Surgery—Continued

George Thomas Gregg	Charles Judson Phelps
Richard Joseph Haggarty	Walter Ellsworth Probasco
William Norman Hartman	John Arthur Puckey
Franklin Henry Hartzell	Ralph Ira Quay
Edward James Hayes	John Joseph Quirk
Farquaharson Henry Hedden	Herschel Devin Rawlings
Alphonse Walker Herrmann	James Windsor Rawlings
John Ericson Heyke	William Bernard Reilly
Joseph Garrett Hickey	Arthur Howard Reynolds
Henry Leigh Hillegas	Charles Sherburne Rice
Ernest Edward Holland	Newton Bertrand Richards
Roy Stanley Howe	Hans Albert Ringger
Richard Owen Howie	Norman Losey Roberts
Herbert Oliver Hutchins	Vernon Dudley Rood
Charles Shoemaker Jack	Oliver Trewren Rule
William Boje Jensen	Harry Wells Ryman
William Thomas Johnston	Albert Edward Sager
Lawrence Henry Jones	Rhodin Cunningham Scudder
Frank Henry Kennedy	Joseph Hackett Shane
Marcus King	Hermann Louis Shape
Frederick William Knott	Frank Elwin Shelden
John Baker Krebs	Charles Louis Siegler
Raphael Laberdesque	Theodore Victor Smith, Jr.
Hiram Herman Lane	Arthur William Stackhouse
James Valentine Langfitt	John Adelbert Stafford
Morris Hampton Leaver	John Prince Stanley
William Chase Macy	Harry Arthur Stevens
Arthur Robert Marks	Roy Richardson Stimpson
Harvey Bailey Marsh	Herbert Arlington Stoughton
Julio Rafael Martinez	Benjamin Hough Stuckert
Joseph Marie McCarron	William Robert Sutherland
John Andrew McClain	Ernst Taussig
Charles Stickles McCowen	Richard Porter Taylor
William Finley McKinley	Walter Beardsley Tewksbury
Charles Thomas McMurray	Harold Stearns Vaughan
Karl Meisel	Henry George Vaughan
Paul Mercier	John Louis Waechter
John Jordan Moffitt	Albert Howard Wallace
Arthur John Moore	William Ross Walter
William Morton	William John Waters
Donald Fitch Mosher	Henry Louis Weber
Julius Müller	Joseph Abraham Weinblit
Edward Avery Newton	Charles Albert Weston
Joseph Haderman Noble	Robert Martin Wetzel
Horace O'Bryon	Harry Franklin White
John Joseph O'Kane	Howard Scott Williams
Samuel Knapp Owen	Charles Israel Winne
Francis Louis Pache	William Gilbert Wright
James Dinwoodie Park, Jr.	Luther Alfred Yeiser
Maurice Augustus Perkins	José Salomon Zamora

Doctor of Veterinary Medicine

Liberty Lyon Cheney	Bassett Kirby
Charles Saladin Gelbert	John Philip Milier
Herbert Hoopes	Ezra Weidman Newcomer
Moses Jacob	Oscar Seeley
Clinton Foster Keiter	Frederick Taylor
Albert George Kern	Norris Lambson Townsend

*Honorary Degrees.***Master of Arts**

Isaac Husik
Walter Crispin Lippincott

Charles Ernest Scott
Frank Julian Warne

Master of Science

Randolph Evans Bender McKenney

Doctor of Philosophy

Mary Bartol
Herbert Eugene Bolton
Oliver Perry Cornman
Joseph Vincent Crowne
Victor William Dippell
John Brookie Faught
Isabel Graves
Cheesman Abiah Herrick
Paul Renno Heyl
George Cash Horter

Fleming, James, Jr.
Joseph Hidy James
Lily Gavit Kollock
Edward Sherwood Meade
Charles Dickens Nason
Cornelius William Prettyman
Arthur Hobson Quinn
Richard Conrad Schiedt
Martin Schütze
Alfred Tingle

Honorary Degrees**Bachelor of Arts**

William Bowen Boulton

Bachelor of Science

Alfred Craven Harrison, Jr.

Louis Childs Madeira, Jr.

Doctor of Science

Coleman Sellers

Edgar Fahs Smith

Doctor of Sacred Theology

Rev. Elwood Worcester

Rt. Rev. Lucien Lee Kinsolving

Doctor of Laws

Hon. John Bayard McPherson

Certificates

BY THE COLLEGE FACULTY:

CERTIFICATES OF PROFICIENCY

IN ARCHITECTURE

Lawrence Stevens Bellman	Charles Philipp Krieg
Clarke Wharton Churchman	Edwin Oscar Kuenzli
Leon Narcisse Gillette	Frederic Foster Lincoln
George Bruckner Rheinfrank	

IN BIOLOGY

Jacobina Somerville Reddie

IN FINANCE AND ECONOMY

Albert Montalbin Wise

IN MUSIC

Amelia Ambruster	Uselma Clark Smith, Jr.
Helene Boericke	Elvan Lenore Vansant
May Evans	Helen Frances Van Tine
Myers Frederick Hall	Bayard Kemble Wilson
William Garrett Rodgers	Edward Watson Pedrick

BY THE MEDICAL FACULTY:

IN MEDICAL JURISPRUDENCE

Brooke Melancthon Anspach	John Cajetan Flynn
Michael Francis Doyle	John Johnston

Prizes

1. THE B. B. COMEGYS PRIZES: one for the best special examination in Latin required for admission to the courses in Arts and Science; Equally to RALPH BERRELL EVANS and SIDNEY JOSE OSBORN: and one for the best special examination in Greek required for admission to the same courses, to SIDNEY JOSE OSBORN.

2. THE EUGENE DELANO PRIZE, for the best examination in the French and German required for entrance to College. To RAFFE EMERSON.

3. A prize, offered by the CLASS OF 1880, for the best examination in Mathematics, by a candidate for admission to the courses in Arts and Science. To GEORGE BULLOCK ATLEE.

I.

FACULTY PRIZES

1. A prize for the best Essay in Intellectual and Moral Philosophy by a member of the Senior Class. Subject: *The Relation of Butler's Ethics to those of Aristotle*. To HENRY WALTER JONES.

2. A prize for the best examination by a member of the Freshman Class in Greek Prose Composition with the Accents. To HERMAN GERVIN CUTHBERT; with Honorable Mention of SIDNEY JOSE OSBORN and ELMER ELBERT CRAIG.

3. A prize to a member of the Senior Class, for the most meritorious work in the German Language and Literature over and above the regular course. (Not awarded).

4. A prize to a member of the Senior Class for the most meritorious work in the French Language and Literature over and above the regular course. To GEORGE WILLIAM BACON.

5. A first prize and a second prize for the best examination on the Lectures on Quaternions, given to the Voluntary Junior Class. To WILLIAM MCCLELLAN and GRANVILLE LEWIS TAYLOR, respectively.

6. A prize for the best Essay in History and English Literature by a member of the Senior Class. Subject: *The Life and Adventures of Sir Thomas Stukeley*. (Not awarded.)

7. A prize for the best Essay by a member of the Junior Class. Subject: "*The Letters of Lady Mary Wortley Montague*." To EDWARD ZIEGLER DAVIS.

8. A first prize and a second prize for the best Declamation by a member of the Sophomore Class, the contest being open to the public. To THOMAS FRANCIS CADWALADER, and LOUIS STROUSSE, respectively.

9. A first prize and a second prize for the best and second best preparations illustrating the anatomy of any vegetable. To ANNIE BELL SARGENT and CASSIUS HINDS WATSON, respectively; with Honorable Mention of AMELIA CATHARINE SMITH.

10. A prize to the member of the Sophomore Class who shall pass the best special examination in sight reading of Latin. Equally to FRANK BROOKE EVANS, JR., and ELIAS ROOT BEADLE WILLIS.

11. A prize to the member of the Sophomore Class who shall pass the best special examination in sight reading of Greek. To FRANK BROOKE EVANS, JR., with Honorable Mention of OSWALD THOMPSON ALLIS.

12. TWO DEBATING PRIZES, established by WILLIAM WEST FRAZIER, JR.: a first prize and a second prize were awarded in a public debating contest to CHARLES ELDRIDGE MORGAN, 3D, '01 Law, and ROLAND SLETOR MORRIS, '99 Law, respectively.

II.

ALUMNI PRIZES

1. THE HENRY REED PRIZE, founded by the Society of the Alumni, for the best English Essay by a member of the Senior Class. Subject: *Thomas Lovell Peacock*. To CHARLES THOMAS MITCHELL.

2. A prize for the best, and a prize for the second best, Latin Essays by a member of the Graduating Class. To HENRY WILSON STAHL-NECKER, and GERSHON BENEDICT LEVI, respectively.

3. A prize for the best, and prize for the second best Original Declaration by a member of the Junior Class. To WILLIAM HAINES PARRY and THEODORE LANE BEAN, respectively; with Honorable Mention of HORACE STERN.

III.

GENERAL PRIZES

1. A prize founded by HENRY LABARRE JAYNE, of the class of 1879, for the best English Composition by a member of the Freshman Class. (Not awarded).

2. THE JOSEPH WARNER YARDLEY PRIZE, founded by the class of 1877, in memory of their classmate, for the best Thesis in Political Economy by a member of the Senior Class. Subject: *The Economic Benefits of Territorial Expansion*. To WILLIAM HAINES PARRY.

3. A prize founded by D. VAN NOSTRAND, Esq., for the member of the Junior Class in Civil Engineering who attains the highest general average of scholarship. To GRANVILLE LEWIS TAYLOR.

4. A prize founded by the PHI KAPPA SIGMA FRATERNITY, in honor of their founder, SAMUEL BROWN WYLIE MITCHELL, M. D., of the Class 1852, for the best work in English Composition done during the year by a member of the Sophomore Class. To DEWITT DUKES BARLOW; with Honorable Mention of LIVINGSTON SMITH.

5. THE GEORGE ALLEN MEMORIAL PRIZES, founded by JOSEPH G. ROSENGARTEN, Esq., for members of the Junior Class taking the Greek and Latin courses, as follows: In Greek, for the best examination on the *Oration of Demosthenes on the Crown*, read with the Professor as an extra subject. (To be awarded in 1900).

In Latin, for the best examination upon selections from Latin Literature of the Empire, to be read with the Professor of Classical Philology as an extra subject. To STANLEY FOLZ; with Honorable Mention of LEONARD DAVIS FRESCOLN.

Second prizes in these subjects, offered by the College Faculty; in Greek, (to be awarded in 1900); in Latin, to HAROLD HARRISON TRYON, with Honorable Mention of LEONARD DAVIS FRESCOLN.

6. The Kappa Kappa Gamma Fraternity offered its Table at the Woods' Holl Laboratory, Mass., for the summer of 1899, as a prize to students in the course in Biology. To ANNIE BELL SARGENT.

7. THE WILLIS TERRY PRIZES.—The following prizes, open only to students in the course in Finance and Economy, have been established by HENRY C. TERRY, Esq., as a memorial to his son, WILLIS TERRY, a graduate of the class of 1896:

(a) A prize for the student of the Freshman Class who shall have the best standing for the year. To ALBERT ADAM CUSTARD.

(b) A prize for the student of the Sophomore Class who shall have the best standing for the year. To LOUIS STROUSSE.

(c) A prize for the student of the Junior Class who shall have the best standing for the year. To SEIZABURO YASKAWA.

(d) A prize for the student of the Senior Class who shall have the best standing for the year. To HENRY JOHN NELSON.

(e) A prize to a student of the Senior Class for special research and investigation upon a subject to be determined by the Committee on Economics, and relating to the financial and industrial conditions of the United States. Subject for 1899: *The Development of Manufactures in the United States since 1860*. To CHARLES SUMNER WESLEY; with Honorable Mention of MILTON DAVID LOEB.

8. The prize of membership in the T-Square Club. To WALTER DABNEY BLAIR and PAUL RAYMOND SIEGEL.

9. THE FRAZIER PRIZE. GEORGE H. FRAZIER, Esq., of the Class of 1887, offers annually a prize of a standard work in literature to be chosen by him, and of a value of one hundred dollars, to the student in the College of the University of Pennsylvania, who, being a member of the football team, baseball team, track team, or of the crew, shall attain the highest standing in scholarship. To OWEN BROOKE EVANS.

10. "The John Stewardson Memorial Traveling Scholarship in Architecture," open to architectural draughtsmen in the State of Pennsylvania over 21 years of age. To ARTHUR HOWELL BROCKIE, B. S. in Arch. (Penna., 1895.)

11. PRIESTLEY CLUB PRIZE. For proficiency in Chemistry. Equally to HARRY MORTIMER FERNBERGER and RAYMOND WELCH TUNNELL.

IN THE DEPARTMENT OF LAW

ARTHUR EDWARD WEIL and THOMAS RÆBURN WHITE were elected Fellows of the Department of Law for one year.

THE FACULTY PRIZE, for the best written examination with all the Professors. In the Third-year, equally to STEVENS HECKSCHER and ARTHUR EDWARD WEIL; with Honorable Mention of ALBERT LUDLOW KRAMER and THOMAS RÆBURN WHITE.

In the Second-year, to CHARLES LOUIS MCKEEHAN; with Honorable Mention of CHARLES HENRY HOWSON and SAMUEL RICHARDSON ROSENGARTEN.

In the First-year, equally to HENRY WOLFE BIKLÉ and WILSON STILZ; with Honorable Mention of LESTER BICKNELL JOHNSON and NEWTON BYRON MADDEN.

THE P. PEMBERTON MORRIS PRIZE, for the best written examination in Evidence, Pleading and Practice at Law and in Equity, to BERTRAM DELROY REARICK; with Honorable Mention of ALBERT EDWARD BARNES and JOSEPH AUSTIN SLATTERY.

THE SHARSWOOD PRIZE, established by the Alumni of the Department of Law, for the best essay by a member of the Graduating Class, to THOMAS RÆBURN WHITE, for his essay entitled, "*Some Recent Criticisms of Gelpcke versus Dubuque.*"

IN THE DEPARTMENT OF MEDICINE

THE ALUMNI MEDAL, with an accompanying Purse of Fifty Dollars, to the member of the Graduating Class who attains the highest general average in examination. To EDWARD BLANCHARD HODGE, Jr.

The Prize of One Hundred Dollars, offered by a friend of the Department to the member of the Graduating Class who passes the best examination in Obstetrics. To GEORGE WILLIAM NORRIS.

The Prize of an Obstetrical Forceps, offered by the Professor of Obstetrics to the member of the Graduating Class who furnishes the best report of a case of Obstetrics occurring in the University Maternity Hospital. To ARTHUR NEWLIN.

The Prize of Twenty-five Dollars, offered by a friend of the Department to the member of the Graduating Class who passes the best special examination in Therapeutics. To CHARLES PATTERSON STAHR.

The Prize of a copy of White and Martin's Genito-Urinary Surgery, offered by the Professor of Clinical Surgery to one member of each of the four Surgical Ward Class sections for reports of that service. To RAYMOND REEVES GANDY.

The Prize of a Surgical Pocket-case, offered by the Professor of Clinical Surgery for the best report of his clinics during the session. To ARCHIBALD SMITH, JR. ; with Honorable Mention of ALBERT BARNES DONALDSON, PETER BODINE CREGAR, and WILLIAM DOUGLAS WARD.

The two Prizes offered by the Demonstrator of Surgery are awarded as follows: A Surgical Pocket-case for proficiency in Fracture Dressings and in Operative Surgery. To FRANCIS WHARTON SINKLER. A Surgical Pocket-case to WALTER ESTELL LEE of the First-year Class, for proficiency in Bandaging; with Honorable Mention of CHARLES DAY MOULTON.

THE ZENTMAYER PRIZE of a Microscope for the best examination in Histology and Embryology. To ROLAND HAZEN.

IN THE DEPARTMENT OF VETERINARY MEDICINE

THE J. B. LIPPINCOTT PRIZE of one hundred dollars, awarded to the member of the Graduating Class who, in the three years spent in the Veterinary Department of the University, attains the highest general average in examinations. To MOSES JACOB.

A prize of an Ecraseur, offered by a friend of the Department to the member of the Second-year Class who passes the best examinations in Veterinary Anatomy. To ERNEST LINWOOD CORNMAN.

Honors

IN THE COLLEGE

SENIOR HONORS

IN ARTS AND SCIENCE

George William Bacon
John Edwin James, Jr.
Henry Walter Jones

Oglesby Paul
Henry Wilson Stahlnecker
Horace Stern

IN BIOLOGY

Harry Fox

Amelia Catherine Smith

IN CHEMISTRY

Harry Mortimer Fernberger

Raymond Welch Tunnell

IN FINANCE AND ECONOMY

Thomas Blaine Donaldson

Milton David Loeb

IN MECHANICAL AND ELECTRICAL ENGINEERING

John Rowland Brown

Edwin Elliott

Charles Day

David Sydney Hilborn

William Campbell Kerr

SOPHOMORE HONORS

IN ARTS AND SCIENCE

Frank Brooke Evans, Jr.,
Charles Fisher Sladen,

William Paul O'Neill,
Clarence Stratton.

IN FINANCE AND ECONOMY

Meredith Bright Colket.

IN CIVIL ENGINEERING

DeWitt Dukes Barlow.

IN THE DEPARTMENT OF LAW

The following members of the graduating class are entitled to their diplomas *cum laude*:

Albert Edward Barnes

Leo Gabe Bernheimer

Carl Miner Bowman

Thomas Boylan

David Newlin Fell, Jr.

Hermann Ludwig Grote

Paul Clement Hamlin

Marcus Stephen Hottenstein

Archibald Todd Johnson

George Lewis Justice

Albert Ludlow Kramer

Francis Aloysius McCarron

Henry Wilmer Moore

Robert Morris

Roland Sletor Morris

Bertram Delroy Rearick

Joseph Austin Slattery

Henry Spalding

Joseph Sundheim

Thomas Raeburn White

Arthur Edward Weil

IN THE DEPARTMENT OF PHILOSOPHY
(GRADUATE SCHOOL)

On the George Leib Harrison Foundation :

SENIOR FELLOWSHIPS

IN AMERICAN HISTORY

Herbert Eugene Bolton, B. L., Ph. D. (University of Wisconsin 1895, Pennsylvania 1899); graduate student University of Wisconsin 1895-97; Harrison Fellow in American History 1897-1899.

IN ASSYRIOLOGY

Victor William Dippell, A. B., Ph. D. (Pennsylvania 1895, 1899); graduate student 1895-99; Harrison Fellow in Semitics 1897-99.

IN ECONOMICS

Edward Sherwood Meade, A. B., Ph. D. (De Pauw 1896, Pennsylvania 1899); graduate student and Fellow, Chicago 1896-98; Harrison Fellow in Economics 1898-99.

IN GERMANIC LANGUAGES

Cornelius William Prettyman, A. B., Ph. D. (Dickinson 1891, Pennsylvania 1899); graduate student Johns Hopkins 1896-97; Assistant in German, Pennsylvania 1897-99.

IN GERMANIC LANGUAGES

Martin Schütze, graduate of Gymnasium of Güstrow, Mecklenburg-Schwerin, Germany, 1886; Ph. D. (Pennsylvania 1899); student Universities of Freiburg in Baden and of Rostock, 1886-89; Harrison Fellow in Germanics 1897-99.

UNIVERSITY FELLOWSHIP IN ENGLISH

Joseph Vincent Crowne, A. B., A. M., Ph. D. (St. Joseph's College 1896, Pennsylvania 1898-99); graduate student 1896-98; Harrison Fellow in English 1898-99.

HARRISON FELLOWS

IN PHILOSOPHY

Hartley Burr Alexander, A. B. (University of Nebraska, 1897); graduate student University of Nebraska 1897-98; Harrison Fellow in Philosophy 1898-99.

IN POLITICAL SCIENCE

William Harvey Allen, University of Chicago 1894-96; Universities of Berlin and Leipzig 1896-97; A. B. (University of Chicago 1897); graduate student and Fellow, Chicago 1897-98; Harrison Fellow in Political Science 1898-99.

IN CLASSICAL LANGUAGES

Barclay White Bradley, A. B. (Pennsylvania 1897); Harrison Scholar in Classical Languages 1897-98; Harrison Fellow in Classical Languages 1898-99.

IN ECONOMICS

Frederick Albert Cleveland, Ph. B. (De Pauw 1890); law student 1890-92; practising lawyer 1892-96; graduate student University of Chicago 1896-98; author of "Annotations to the Laws of the State of Washington," 1894, Supplement 1896; "Growth of Democracy in the United States," 1898; "Legislative Tendencies in the United States Relative to Capital and Labor," 1898, etc.

IN BIOLOGY

Henry Shoemaker Conard, B. S., A. M. (Haverford 1894-95); graduate student, Haverford 1894-96.

IN ENGLISH

John Louis Haney, A. B. (Pennsylvania 1898); Harrison Scholar in English and History 1898-99.

IN MATHEMATICS AND ASTRONOMY

Ulysses Sherman Hanna, A. B., A. M., (Indiana 1895, 1897); Instructor in Mathematics, University of Indiana.

IN SEMITIC LANGUAGES

Walker Moore Levett, A. B. (Pennsylvania 1898); graduate student 1898-99.

IN GERMANIC LANGUAGES

Orlando Faulkland Lewis, A. B., A. M., (Tufts College 1895, 1897); Assistant in Modern Languages, Tufts College, 1895-1897; student University of Munich, 1897-98; Harrison Fellow in Germanics 1898-99.

IN EUROPEAN HISTORY

William Ezra Lingelbach, A. B., (University of Toronto 1894), Fellow 1894-95; student, University of Leipzig, Germany, 1895-96; University of Chicago 1897-98; Instructor at the Michigan Military Academy, Orchard Lake, Mich., 1898-99

IN ROMANIC LANGUAGES

Daniel Ernest Martell, A. B. (Pennsylvania 1898); Harrison Scholar in Modern Languages 1898-99.

IN PEDAGOGY

Ira Bennett McNeal, A. B. (Dickinson 1898); graduate student, Pennsylvania 1898-99.

IN CHEMISTRY

Thomas Maynard Taylor, B. S. (Oberlin 1897); graduate student, Pennsylvania 1897-99.

IN AMERICAN HISTORY

Claude Halstead Van Tyne, A. B. (University of Michigan 1896); student, Heidelberg, Leipzig and Paris, June 1896 to November 1897; Harrison Fellow in American History 1898-99.

FELLOWS AT LARGE ON THE HARRISON FOUNDATION

IN AMERICAN HISTORY

Carl Lotus Becker, B. L. (University of Wisconsin 1896); graduate student, Wisconsin 1896-98; Fellow 1897-98; Fellow, Columbia, 1898-99.

IN ENGLISH

Morris William Croll, A. B., A. M. (Harvard 1894-95); graduate student, Western Reserve, 1896-98.

IN SOCIOLOGY

James Edward Hagerty, A. B. (University of Indiana 1892); graduate student, University of Chicago, 1896-98; University of Berlin, 1898-99.

IN ZOOLOGY

John Raymond Murlin, B. S. (Ohio Wesleyan, 1897); graduate student, Pennsylvania, 1898-99.

IN CLASSICAL LANGUAGES

Nicolaos Panagis Vlachos, Graduate Gymnasium of Haarlem, Holland; student, University of Amsterdam, 1897-98; Pennsylvania, 1898-99.

ON THE HECTOR TYNDALE FOUNDATION

FELLOW IN PHYSICS

Charles Tyndall Evans, A. B. (Dickinson 1896).

THE ALUMNÆ FELLOWSHIP FOR WOMEN

FELLOW IN MATHEMATICS

Roxana Hayward Vivian, A. B. (Wellesley, 1894); graduate student, Wellesley, 1896-98; Alumnæ Fellow in Mathematics, 1898-99.

ON THE JOSEPH M. BENNETT FOUNDATION

FELLOW IN EUROPEAN HISTORY

Caroline Colvin, A. B. (Indiana 1893); Instructor in History, Fort Wayne High School 1893-98; Bennett Fellow in European History 1898-99.

FELLOW IN AMERICAN HISTORY

Lolabel House, A. B., A. M. (University of Nashville, 1893, University of Chicago, 1898); graduate student University of Chicago from 1895 to 1898 (seven quarters).

ON THE FRANCES SERGEANT PEPPER FOUNDATION

FELLOW IN CHEMISTRY

Margaret Baxter Macdonald, B. S. (Mount Holyoke 1897); graduate student, Bryn Mawr 1897-99.

**ON THE MRS. BLOOMFIELD MOORE FOUNDATION
FELLOW IN SOCIOLOGY**

Emily Fogg, A. B. (University of Chicago 1897); Fellow in Sociology,
Bryn Mawr 1897-98; Fellow by courtesy and graduate student
1898-99.

FELLOW IN ZOOLOGY

Caroline Burling Thompson, B. S. in Biology (Pennsylvania 1898); grad-
uate student 1898-99.

**HARRISON SCHOLARSHIPS
IN ROMANIC LANGUAGES**

George William Bacon, B. S. (Pennsylvania 1899).

IN PHILOSOPHY

Frank Goess Bossert, A. B. (Pennsylvania 1899).

IN ZOOLOGY

Harry Fox, B. S. in Biology (Pennsylvania 1899).

IN ENGLISH

Henry Downing Jacobs, A. B. (Pennsylvania 1899).

IN ECONOMICS

Henry John Nelson, B. S. in Economics (Pennsylvania 1899).

George Christian Sheetz, B. S. in Economics (Pennsylvania 1899).

IN GREEK

Henry Wilson Stahlnecker, A. B. (Pennsylvania 1899).

IN HISTORY

Milton Bigler Wise, A. B. (Pennsylvania 1899).

COMMENCEMENT ADDRESS.

By Hampton L. Carson, A. M., LL. B.

PROVOST HARRISON, in presenting the Orator of the Day, said that Mr. Carson was one whom he might well call a "University service man;" that, for eighty years, a Carson—father and son—had served the University of Pennsylvania with unwavering fidelity.

Members of the Graduating Classes of the University of Pennsylvania: I never face an audience like this without a sense of awe: I never see masses of human beings, rising tier upon tier, their gaze turned in one direction and burning with six thousand eyes into my heart, without being oppressed with the responsibility of directing into some profitable and useful channel the thoughts and sympathy which are voluntarily yielded to the articulations of the voice. On this occasion I feel the weight of responsibility in an unusual degree.

To the students in two departments I have sustained the personal relation of teacher, and I have formed friendships which will last as long as life. To those whom I do not personally know, I extend the felicitations of the members of the various faculties in whose behalf I speak; and to all I utter a word of cheer and congratulation upon your success in having won the laurel crown.

It seems proper before we part that I should express a few thoughts in relation to what may be called "the University Idea." We live in an age of extraordinary and strenuous activity: we see on every hand the most enormous consolidations of capital, and concentration of financial, intellectual and moral efforts. The University has yielded to the spirit of the age, and seeks in her own way to represent the consolidated intellectual interests of the world. Nothing that is of human interest is foreign to her

purposes, nothing is too insignificant or remote: the most distant times and the most distant lands are drawn into the closest association with our own, and are made to yield up their treasures for the advancement and benefit of mankind.

The first thought that I wish to emphasize in this presence is the utter inadequacy of the capital invested in our University work to the full performance of the onerous and responsible tasks which are imposed upon our University. I have often heard it said by many well-meaning but ill-informed persons, when applied to for aid, "Oh, you don't need money, you are rich, you have a plant of \$7,000,000." The remark is far distant from the facts: it is misleading in the extreme; and, worse than all, it encourages in indifference many who are not acquainted with the real condition of affairs. Suppose I grant, for the sake of argument, that we have an establishment which represents \$7,000,000. It must be borne in mind that the greater part of the plant of a great University is unproductive. It consists of buildings, grounds, apparatus, and books necessary for the housing, teaching, comfort, and physical and intellectual well-being of nearly three thousand students, upon whose labor there is no profit. It is not like an industrial establishment, where wage paid employes labor for the pecuniary advantage of their employer. Were a student charged with his individual proportion of interest on capital invested, deterioration, construction, maintenance, extension, equipment, salary and expense accounts, and for the use of libraries, dormitories and athletic fields, none but the sons of the very rich could enjoy the advantages of a liberal education. It costs far more to educate a student than is paid by him in fees. Statistics show that but 7 per cent of the revenues of our universities and colleges is derived from tuition fees. Hence at the end of every year there is a large deficit, which must be met by individual aid, or by State appropriations.

Let me give you a few figures which will need no comment of mine to make their meaning plain. I will take the year 1895 as being the last one for which we have reliable comparative statistics; and, although the figures have since been greatly increased, yet the relative proportion, or rather disproportion, remains the same. The amazing thing to me is not that there is a difference, but that the difference should be so great. In 1895, the total value of the grounds and buildings owned by all the colleges and universities throughout the United States amounted to \$114,362,542: and in the State of Pennsylvania the total was \$8,641,953. That represented the accumulated wealth of nearly two hundred years of toil. In the same year the pork-packers of the West paid for hogs alone more than \$172,000,000, while there was invested in the manufacture of electrical supplies the sum of \$1,500,000,000.

In 1895, the value of the scientific libraries and apparatus of all the colleges and universities in the United States was \$15,258,000, and in Pennsylvania \$1,023,234. In the same year the capital invested in breweries was \$400,000,000, and the annual output \$200,000,000. Of productive funds, the total for all the universities in the United States was \$102,574,000, and in the entire State of Pennsylvania \$6,334,808. In the same year, there was paid in wages to the laborers in textile manufactories alone \$176,000,000, and the sale of the product of that labor amounted to \$722,000,000. The total income of all the universities and colleges in the United States—from all sources, from tuition fees, productive investments, State, municipal and federal appropriations—was \$16,783,638, and in Pennsylvania \$1,207,543. In the same year the product of American mines was \$553,000,000: and, if you add up the values of the cotton crop, the corn crop, the wheat crop, the rye and tobacco crops, you will have a total of over \$1,230,000,000. While the universities throughout the

length and breadth of this republic were receiving from every source an income of \$16,783,638, there was paid in premiums for fire insurance alone the sum of \$140,000,000; and in life insurance the sum of \$205,132,044: while the profit to the Western Union Telegraph Company on its business for a single year was \$6,141,389.

In 1895, there were but four universities in the United States with a capital in excess of \$5,000,000 each, and yet the Adams Express Company had an aggregate capital of over \$60,000,000. The investments in telephones were \$77,500,000. In street railways there was invested \$1,300,139,711; and in railroads there was \$10,741,363,319.

How idle, then, it is to talk of the wealth of the University, or of the breadth of its financial basis! The fact that the Leland-Stanford University in California, and the University of Chicago, and the recipients of the recent gifts of Mr. Carnegie have received munificent assistance, is an indication that intelligent men have at last awakened to the necessity of making the broadest and most ample provision for the cause of higher education.

Let me call your attention to another fact. The census in 1890 showed a total population of 62,622,420, of which 22,735,661 were engaged in the various classes of occupation—leaving about 40,000,000 entirely unemployed; of whom the larger number, of course, were women. The classified figures of the census showed that about 30,000,000 represented the female portion of the population. There was therefore a surplus of at least 10,000,000 of men absolutely without occupation of any kind. Of the 22,000,000 employed in industrial pursuits we find there were engaged in agriculture, fisheries and mining, a total, male and female, of 9,013,333; in domestic and personal service, 4,360,577; in trade and transportation, 3,326,000; in manufacturing and mechanical industries, 5,091,122; while in professional pursuits there were engaged only 944,333.

Our population to-day numbers probably 78,000,000:

and yet the total number of students in all the universities and colleges, public and private, throughout the United States, including colleges for women, agricultural and mechanical colleges and scientific schools, is only 97,134. In schools of medicine, law and theology, including dentistry, pharmacy and veterinary medicine, the number is 52,249. If you will add to these figures all the pupils in the Normal Schools, and all those receiving elementary instruction of the primary and grammar grades, and will then add all those receiving secondary instruction of the High School grade, you will have a grand total of 16,255,093. Think of it—but sixteen millions and a quarter out of seventy-five millions of people! After making due allowance for those who have already received an education and have passed from the halls of learning, I insist that it is no exaggeration to say that there are in this country twenty millions of people—boys and girls, men and women—awaiting instruction even in its most rudimentary form. What a strain and a pressure upon the resources of our educational institutions! How are we prepared to meet it? In Pennsylvania, where we have a population of one million in excess of that of all the six New England States combined, with six times their aggregate wealth, we have dedicated to the cause of higher education only one-fourth of the amount already invested and applied in New England to that end.

Men and women of Pennsylvania, does not this touch your State pride; will it not arouse you to exertion? Shall we, who are foremost in mines, in agriculture, in manufactures, in finance, in the arts and sciences, in law, in medicine, yield our place and rest content with a subordinate position in respect to the higher and best interests of education?

And yet, heavily handicapped as we have been (and I make the assertion on this platform with the proud assurance of its truth), the University of Pennsylvania stands

in successful competition beside fair Harvard, and ahead of every other college in the land. When I see our Provost, facing almost alone the tremendous responsibilities of his exalted station; endeavoring by indefatigable exertions to arouse this community to some fair appreciation of the importance and magnitude of his task; toiling by night and by day to build up a mighty citadel of thought to fight against the kingdom of darkness, of ignorance and of obscurity: I feel that I would be destitute of every spark of gratitude if I failed to say that he deserves and has earned the approbation and the zealous support of every true and loyal citizen in the State. He has won our applause—now let us give him help!

My former pupils—my Fellow alumni: if we were soldiers on the field of battle and saw the captain of a gallant company contending against fearful odds, we would call upon the mountains to cover our shame if we failed to rush to the rescue. Let us do for him what he has long done for us. Let him feel that there is a sympathetic nerve which can be touched in the breast of every one of the sixteen thousand sons of Penn. Oh, that my voice could reach them! Oh, that I could persuade the merchant, the capitalist, the banker, the manufacturer, the professional man, and the man of leisure, in this gracious year of abundant and widespread prosperity, to believe that there can be no nobler consecration of wealth, no earthly acts richer in beneficent results, than generous gifts to the cause of learning!

The value of the plant of the University of Pennsylvania, after one hundred and sixty years of toil, is exactly equal to the cost of two first-class battleships. That is a plain statement and one easily understood. And yet how much greater than a battleship is a university! Recalling the thronging thousands who, a few weeks since, crowded our wharves to view the gallant "Raleigh" as she lay in the waters of the Delaware, and contrasting them with the few

who, in reflective mood, bend their steps in the direction of our noblest institution of learning, I am impressed with the difference between the physical effects produced by masses of destructive steel, and those effects which, requiring contemplation, tax the noblest powers of the most highly educated mind to grasp in their fulness and sublimity. A battleship appeals to the not yet extinguished ferocity of man. Its vast bulk, its tonnage, its length, its displacement, its speed, its deadly armament, its death-dealing shells, the skill of its captain, the courage of its men—all affect most powerfully the imagination. You may measure the velocity of a projectile from a twelve-inch gun; you may gauge the heat of the flame which burns through the vent to the detonating powder; you may even determine the muscular force of the arm which pulls the lanyard: but greater than all is the chemist of the laboratory. As Bismarck said, the chemist will be in the future the arbiter of the fate of nations. Behind the gun stands the gunner, behind the gunner stands the officer of the deck, above him is the captain, and higher still stands the Admiral. You may repeat those words which have revolutionized the history of this country, nay, the history of the world—spoken at sunrise from the bridge of the “Olympia”—“You may fire, Gridley, when you are ready”—but behind the Admiral there stood the President, and behind the President there stood the People, and behind the People there flamed the burning torch which Liberty, thrusting her way through two thousand years of history, had carried through oceans of blood and rivers of tears, until at last she planted her dauntless and heroic footsteps upon shores long trodden by the tyrant and his slaves.

Whence came that light? Where was it kindled? How was it nurtured? In the bosom of the university. How came it there? When Grecian literature and Grecian philosophy, the dialectics of Aristotle and the philosophy of Plato, wedded to the science of Arabia and the learning

and works of Razes and Avicenna penetrated Europe, then Roger Bacon, a monk, awoke to the invention of gunpowder and to a study of the physical universe. His labors aroused a far mightier mind, that of Francis Bacon; and the inductive philosophy overturned the throne of the Stagirite. Bacon moved Hobbes, Hobbes stirred Locke into opposition, Locke inspired Sidney, Sidney communed with Penn; and from Penn came Benjamin Franklin, the State House and Congress Hall. Sir Thomas More discovered the lonely lamp of Erasmus, and by its light read the Republic of Plato; and from Plato's dreams came the Utopia, Harrington's Oceana, Campanella's City of the Sun; and from these were evolved the Pilgrim Commonwealth, the Old South Church and Faneuil Hall. These are the fruits of "the university idea" through the ages.

In contemplating the "university idea," I am impressed first, by its antiquity; next, by its immortality or indestructibility; then by its vitality and expansiveness; then by its practicability and usefulness; and finally, by its beneficence.

The antiquity of the university! Is there anything in Europe that is so old? We Americans turn back with awe to the time of Columbus, realizing that we are separated from the men and events of that day by the gulf of centuries: and yet, far beyond the days of Columbus, stretching back to the time of Charlemagne or Philip Augustus, we read of the founding of universities, of that of Paris, of Bologna, of Oxford and of Cambridge. How old they seem! Can any man tread the sod of the quadrangles, or walk in the cloisters, without realizing that for a thousand years they have spread their gardens to the moonlight and whispered from their towers the enchantments of the Middle Ages? Old? Yes, older than the Kremlin, older than the Doge's Palace, older than Royal Windsor, older than the Escorial, almost as old as the Norman Keep, gray and wrinkled as it stands in the bosom of the Tower

of London. Old, but not decrepit. Hoary, but alive with immortal life. There, in the university, glowed the deathless spark of intellect. Old Chaucer wrote: "The eye of intelligence is here, because it surmounteth the environage of the university." Lord Bacon wrote: "The images of men's wits and knowledges remain in books exempted from the wrong of time, and capable of perpetual renovation. Neither are they fitly to be called images, because they generate still, and cast their seeds in the minds of others, provoking and causing infinite actions and opinions in succeeding ages: so that, if the invention of the ship was thought so noble, which carrieth riches and commodities from place to place, and consociateth the most remote regions in participation of their fruits, how much more are letters to be magnified, which, as ships, pass through vast seas of time, and make ages so distant to participate of the wisdom, illuminations and inventions, the one of the other?"

The immortality of the university! On the banks of the Neckar, within sight of the Rhine, upon a commanding eminence, stands the castle of Heidelberg; a relic of feudal times, a sample of the splendid work of the Hapsburgs, but yet a ruin, a fossil monument of dead tyranny in stone. The shock of war has overthrown its battlements, and cast its bastions into the ditch; yet, older than the castle, and still alive, is the University of Heidelberg, still sending forth her sons to every corner of the earth. Immortal: yea, indestructible; realizing the legal definition of a corporation, "an invisible, intangible, immortal thing;" young and vigorous in vitality and expansiveness: crushed by no wars, surviving crowns and dynasties, the wreck of parties, and the shifting of boundaries; serene and tranquil in the midst of tumult, unchanged where all else is changeable, waxing stronger and brighter and more enduring from age to age.

Most practical and useful! No longer wrapping herself

in monkish robes of self-exclusiveness; no longer asserting that the dead languages alone are the keys to unlock the storehouses of learning; no longer juggling with scholastic logic; no longer exercising the necromancy of the black arts; but opening her heart and extending her hands to all the interests of life; throwing open laboratories, dissecting halls and lecture rooms, and allying herself with rolling mills and shipyards. A university library is no charnel chamber, where the ghosts of the dead may dance; but it is a quick-forging, a working house of thought, where thunderbolts are rolled and wrought, where telluric forces to lift the globe are generated, as earthquakes are conceived in the womb of the mountains.

Then, too, the beneficence of the university. She never kindled the fires of an *auto da fe*. She never built a Bastille; she never spanned the stream of Life with a Bridge of Sighs; she wears no blood-stained garments. She walks in the beauty of charity, with consideration for all.

Gentlemen: Is it not one of the most precious privileges which can be bestowed upon you, to aid in the development and the upbuilding of an institution which seeks to achieve purposes such as these? No time and no country is alien. There have been brought from Egypt and Babylonia and South America the most extraordinary relics, to show that the past ages of the world can yield up something practical for the instruction and delight of this generation. The science of Arabia has lessons for us. The institutes of Menu can interest the children of the Common Law. You, of the Medical Department, if attentive to the history of your own profession, can trace it back to the mythical Hippocrates. You may perceive in the culture of a single drug the march of civilization. You may read the history of Turkey in that of opium; of China in that of camphor; of Tartary in that of rhubarb; of the Andes in that of Cinchona bark. In the trade in costly

gums and spices you have the history of the Portuguese in India, the cession to the Dutch, and that steady march of English commercial supremacy which has engirdled the earth. You, students of law, know that the greatest intellectual contribution to the jurisprudence of the world was the *Corpus Juris Civilis*, which, when engrafted on the Common Law has given us the practical commercial liberty we now enjoy. You, students of chemistry and metallurgy, are debtors to the alchemist and astrologer. You, graduates in arts and letters, still glow with the raptures of Athens and of Rome.

Gentlemen, the university idea, endangered as it is by a lack of sufficient nutriment, demands your sympathy, your aid and your support. Remember that a University-bred man is, everywhere and at all times, an accomplished gentleman. He holds in his hands the keys of knowledge and of power; he is inspired by honorable traditions, and owes allegiance to the mother of his mind. For him there can be no more pious pilgrimage than to come to these annual gatherings of her son, from far distant places, to kneel again at the altar of learning, and keep alive the sacred fire.

Gentlemen :

“ Farewell—a word that must be and hath been,
A sound that makes us linger,—yet farewell.”

GRADUATION SERMON.

By the Rev. Floyd W. Tomkins, D. D.

Preached before the Graduating Class of the University at
Holy Trinity Church, Philadelphia, on Sunday,
June 11, 1899.

"The voice said, Cry. And he said, What shall I cry?"—ISAIAH 40: 6.

The great gospel prophet is represented as hearing a messenger from God bidding him to his task and defining the character of that task. As he stood there between God and men—God, the holy, just, loving Father, and men, sinful, wandering and ignorant—Isaiah seemed a type of the leaders and reformers of humanity. Above his fellows, because of his educated insight into the larger order of events; with a vision coming from God of what the world might be if only God's will were fulfilled; with a certain consciousness of power, and a glorious enthusiasm which attracts us in spite of ourselves, he stands facing life and wondering what can be done, wondering what *he* can do. Quite unlike us in our modern conception of duty, he does not seem to care very much for his own success or advancement. Life means creation and reformation, not gain or honor. The individual finds himself, he seems to show, not in any mere following of professional order, nor in any seeking for easy prominence or success; but rather in the building up of the whole mass which awaits his warm hand and thrilled heart. God, the ideal good, the Ruler, the King, the All-Father, is above. From Him comes the inspiration, the enthusiasm, the love of life. The world, still unformed, still the old Hebrew "Tohu va Bohu," "without form and void," is around, answering the Father's message of enthusiastic inspiration with a hopeless moan of conscious misery. Between the two stands the *man*—ah, that glorious name *man*!—a prophet still, a reformer still, a messenger still, listening for the voice. "Hark! one saying, Call. And he answers, What shall I

call?"—My brothers, is it not a timely message for us to-day, as we stand here with a certain tingling of anticipation, with a knowledge that after all there is something for us to do, and that the field and the King are on either hand, and we are the messengers from the one to the other? It is the old story which Jean Ingelow so pathetically pictures in her "Dead Year:"

"On her bier
Quiet lay the buried year;
I sat down where I could see
Life without and sunshine free,
Death within, and I between."

Oh, to know life's meaning! Oh, to recognize that in all our callings, through all our professions, in all our talents, there must be a deeper, larger truth than most of us see! "Know thyself," cried the Greek, and in knowing one's self the world comes in. We see ourselves best in our environment. We find ourselves by losing ourselves in the great throbbing, starving, crying life about us. *It* tells us what we are here for—*it* makes clear the will of God. Arthur Hugh Clough tells it plainly as he pictures the soul wandering about with a question, *the* question, unanswered:

"What we, when face to face we see
The Father of our souls, shall be,
John tells us does not yet appear;
Ah, did he tell what we are here!

A mind for thoughts to pass into,
A heart for loves to travel through,
Five senses to detect things near,
Is this the whole that we are here?

Rules baffle instincts, instincts rules;
Wise men are bad, and good are fools;
Facts evil, wishes vain appear;
We cannot go—why are we here?

Or is it right and will it do,
To pace the sad confusion through,
And say, "It doth not yet appear
What we shall be, what we are here?"

Ah, yet when all is thought and said,
The heart still over-rules the head;
Still what we hope we must believe,
And what is given us, receive;

Must still believe, for still we hope
That in a world of larger scope,
What here is faithfully begun,
Will be completed, not undone."

And this "world of larger scope" is before us now. There is no longer such mystery as the ancients spoke of. Science and economics have taken the place of dreamy philosophy. The Kingdom is coming daily in the struggle to bring order and righteousness to the unformed creation. For everyone of us, as for the great Isaiah, I am sure it is true that we hear a voice, the voice of our God, saying "Cry." The only perplexity for us, as also for him, is in this : "What shall I cry?"

What message does the world need to-day? We need not specially concern ourselves as to the mode of the deliverance of that message. Of course we shall be awkward at first, and unwise and extreme; every true man is, for his very intrepid zeal makes him trip over himself in his haste. No matter for that. The great thing is a tremendous realization of the need of a cry materialized into fearless action, or rather endorsed by fearless action, which shall arouse a contented world from its lethargy and bring it to a consciousness of itself and its wants.

Before I speak of the cry in its special character, I would disarm possible objection from any of you by reminding you that this crying is the interpretation of all life-work, of whatever character. A man may be a minister, or a lawyer, or a physician, or a merchant; but he only rises to the fullness of his profession as he hears the voice saying "Cry to a world which needs truth and justice, and healing, and honesty." It is not by uncertain reformers, who have left definiteness behind them and become like wandering stars, that the best work for the world is done. Men, like

ships, need ballast and anchorage. And always the man of singular aim in one direction is the best accredited and strongest influence in the general work of reformation. To know how my own calling can answer the world's needs; to see how my own gifts can be turned, not to *my* advantage, but to the real and lasting advantage of humanity: that must surely be the exact guide to the use of ourselves. One grows weary of men without a business of some kind. It is the curse of the unemployed who call at our door and have no trade and so can get no work: it is the curse of some men of wealth who, having time for anything, really have no time at all, because there is no one thing which they can do. But worse even than this unprofessionalism is the narrowness which binds any man so tightly and narrowly to a calling that he can see only the little details of that calling. Professional diligence is good if only it is interpreted and understood by all the wants of a great life waiting for generous and wise touches to bring it to beautiful strength. But he only can be a success in his specialty who gains a clear consciousness of the environment of his specialty, and, working for one part of the human, knows how the other parts are sympathetically interested. If any of you are uncertain as yet regarding your life-work it were well for you, earnestly on your knees but with your eyes open, to find out what your cry to the world shall be. If any of you, and I suppose this is true of *most* of you, have fixed upon a career and are ready to begin it, may I be permitted, in this solemn place and at this weighty time, to urge you not to narrow your sphere, but to make your cry all the more eager because of your anchorage to a fixed profession? The world is accustomed to criticise "professionalism," not only because it is mechanical and cold, but because it is narrow and selfish. The true holder of a profession can never become narrow and selfish if he knows he is sent to be one of many in the erection of high ideals and noble practices: if he knows he

has a cry for the world to hear which comes to him by divine inspiration: if he believes that the world needs betterment and that he can do something in that betterment if he is loyal to his work, himself, the world, and his God.

What then are the needed characteristics of the cry which we are to give as we go out to face the world? "What shall I cry?"

I. I believe the lines are clearly marked for us, and follow the suggestions of this present age. They are seen in the political, the economic, the moral, and the religious struggles of our day. Let us take them in this order. A cry to the political life. Now, do not dread lest I enter upon a discussion of modes of government, or upon the burning questions of the hour for us in our dear United States. My theme is at once broader and simpler. There is needed today a clear cry from our young men of healthy, independent, patriotic loyalty, exemplified by active love for country and manly endeavor to carry out the principles of common brotherhood. Never was there such need as today for young educated men to take a part in government, not by "*running* for office," a telling phrase, by the way; nor by assuming an unnatural partisanship: but by standing for honesty and moral righteousness, and crying against the usurpation of any interest for private gain or partial popularity. The whole world to-day is in a kind of flux state. All ages are transition ages, but never have such questions and such problems confronted any people as those which face English-speaking folk now, as they hold the high knowledge and *noblesse oblige* of true civilization and culture before all the world. How shall we show men what high living and thinking and believing can do? Write books, say some. Talk, say some. Act together, say some. But the real answer, vital, and underlying all else, is, "Be yourself an example;" an example in an expression of interest; an example in marked and expressed reprobation of wrong; an example in earnest

aggressiveness which shall prove protestation honest. There is to-day amongst us in politics a state similar to that which is said to exist in the midst of French society—a “bored” condition, an “ennui,” a “laissez-faire,” “nil admirari” spirit, which is simply tired of the whole business. And the intellectual man, loving books and immersed in professional pursuits, turns away from public affairs, with no cry to utter, with no enthusiasm to urge out a cry. I need not say how utterly contemptible such a condition is. Your glowing youth condemns it. Yet the danger is that after a few spasmodic efforts you will either drop your anchorage and become a politician meeting like with like; or else, sick of the association, turn away with disgust. It is to save you from either of these unhappy results that I urge the middle course: persistent effort, quiet, honest, good-tempered, but not *weak*-tempered, endeavor to make government—municipal, State, national—all that you and I know it ought to be, and also sadly know it is not. There is no time, nor is this the place, for particulars. We can work as the call comes, and our work will be all the more telling because of our business holding and freedom from suspicion of office-seeking. But oh, young men, I do beg of you, with all my heart, with the earnestness of one who from his watch-tower sees the needs of the hour, I beg of you to give to your country that service in time of peace which you were all so ready to give in time of war, a service far more deadly and far more important in peace than in war; a service demanding more unflinching loyalty and daring, a service which shall make the cry of your youth ring out like the shout of Gideon and his brave 300 in the valley of Midian. “*Dulce et decorum est pro patria mori*,” said the old Roman. To-day the true American cries: “*Dulce et decorum est pro patria vivere*.”

II. In economic life and study there has been such a marked change amongst us of late years that we can hardly realize the advance, or the really grave danger of

partial and limited knowledge. The election to the presidency of one of our most conservative colleges of a man of youthful enthusiasm and of pronounced views on social questions is only an indication of the interest which is manifested in a thousand ways. Courses in sociology are largely taken in colleges and seminaries, and professional schools of every kind are dealing, as of necessity, with these modern results of an advanced civilization based on the rock of altruism. Nor will the earnest man to-day hold back from any effort which shall make brotherhood a reality, and not a pleasing platform fiction. Our university settlements, our societies for economic studies, our law and order leagues, and our National Commissioner of Labor, are only signs of the times. We need a clear, strong cry here; for the world in her faulty condition is weary of cranks with theories so impracticable, and of unbalanced reformers having only one eye and that turned in only one direction. Yet the issue is great. Consider, my brothers, that nothing is deemed impossible now. The "New Republic" is seen as an actual fact even though still untried. As Dr. Strong so well says in the opening lines of that remarkable book, the "New Era": "We are entering upon a new era, of which the twentieth century will be the beginning, and for which the nineteenth century has been a preparation."

"Out of the shadow of night
The world moves into light;
It is daybreak everywhere."

Our cry therefore must be steady and balanced, not hysterical. To keep one's head cool when glorious issues, prayed for for centuries, are coming to the full, demands great force. To ask men to prepare themselves for a new day; to hold strictly to principles for a while until their application is clear; above all, to have that intense sympathy with common need, and that clear conception of selfishness which shall make us to be trusted by both sides, in the coming era of social reconstruction: that is the

first necessity. And the second is like unto it, for upon the two hang all law and truth; viz., to be just in personal dealings: to let the cry be through living as well as through teaching; to hate the garment spotted with blood, the "cheap clothes and nasty," born of our sweat-shops: to believe in honest business; to study evils; to know how other men live in our very midst; that is the way to make men hear and answer. It is a cry of new and hitherto unrealized brotherhood, though JESUS proclaimed it two thousand years ago. It is a cry condemnatory of luxury, as bold as the speech of Savonarola. It is a cry of peace between man and man as sweet as the angels' song on Bethlehem hills. It is the proclamation of the smokeless battle of the ages, of the noiseless and bloodless reconstruction of human relationships, the new birth of a new freedom which shall be mutual service, a oneness which shall not be sameness, but which shall have all the fruits of the spirit. "What shall I cry?" Ah, cry hopefully of a dear community of living when men shall stand as helpful brothers, with the plea of the prophetic old Roman: "I am a *man*, and nothing pertaining to man is without an interest to me," echoed by the modern American plea: "All men are born free and equal." Cry with boldness against public and private disregard of common interests. Cry with intelligence, with calmness, with discernment, but oh, cry aloud, and spare not!

III. A cry to the moral life. Sin is in the world. It is a great fact from which we cannot turn away. It plagues us beyond endurance in our personal experience and will not suffer us to rest in peace. It plagues us as we see its effects in the life about us, and if we are true men we cannot rest easily or let it alone. It stands out boldly in three ghastly shapes: impurity, intemperance, gambling; and it calls to us, with its horrible Meplhistophelian laugh: "What do you think you can do with me?" What shall our answering cry be, my brothers? Shall we give a wild

cry of defiance, and rush like the brave six hundred to a Balaclava of bravery, but of defeat? Shall we give a cry of despair, and sink back into dead indifference, paralyzed by our powerlessness? Or shall we calmly give a cry of determination that there shall be no truce till the evil be dead under our feet? For you know how this sin touches us, and haunts us, and tears us. We are men of honor, and respect our manhood, and yet the stains of impurity come, and we are ashamed. We call ourselves masters, and yet it is so hard for us to resist the social customs and stand on that only safe rock for us men—total abstinence from all that intoxicates. We love honesty, and yet the common custom of getting something for nothing, of *securing* rather than *earning* money, is a custom we find it hard to battle against. Yet we *must* battle. And I lovingly dare to plead with you, oh, strong young men, as you go forth to give your message to a waiting world, that you be pure, and temperate, and honest in your lives, else must your message be vain. Hold yourselves as men of iron when these temptations come. Yield not an inch to any pleadings or sarcasms or weak innuendoes which will try you as you go on in life. For a messenger must be clean, and cool and true if he would have his message received. And then, we must fight these moral battles for the world's sake. Our cry must be for good and true living to the world so sadly oppressed by this trinity of evil. We have not time here to go into particulars. You and I know well enough how the "social evil" is the problem which philanthropists and philosophers are trying to solve; how it enters the family, and blasphemes the holy rite of marriage with the sin and shame of divorce; how it enters the book and paper on our tables and seeks indubitably to rob us of delicacy of taste and discernment; how it blackens the drama and makes the stage a spectacle of sadness. We know how drunkenness lies at the root of nine-tenths of our crimes, and fills our prisons and almshouses and insane

asylums; and the saloon, we well know, is always and everywhere the enemy to public peace. We know how the gambling dens lie as black spectres round about our streets; while on many a floor of stock exchange and brokers' office by fictitious means money is gained or lost. What shall we do? Ah, to cry with a fearless courage to the world—to make our lives a message of warning and of inspiring enthusiasm as we fight like men against these enemies! Life is a mockery if they cannot be downed. Marcus Aurelius might cry: "Protest till you burst, but men will go on all the same." But our Christian interpretation of manhood knows no failure. The world must and *will* become moral—if we men do our part.

IV. And finally a cry to the world concerning religion. There is a God, and He loves us, and He sent His Son to show us how to live and to give us power; and He gives His Spirit to guide us. That is the outline of what we call Christianity. And it lies at the foundation of all true living. Without it there can be no real knowledge, no inspiration, no courage, no manliness. If I am God's son, then all else follows, and follows so logically that I can cry with an absolute assurance that the world *must* hear me. If I know JESUS as the example and the power; if He is my personal friend so that the divine and the human are one; and if I know the life I live is unending, never to cease, never to fail, never to go backward; if my struggles are simply those of a savior, a deliverer, to lift the earth nearer to God in knowledge and goodness: why, then, I am a man indeed, and free. My brothers, without this great knowledge our lives are not worth living. If we are to cry with any reality we must be the loving sons of God. And oh, how pitifully the world is waiting for some such message! She is restless in the conflict of hopes and fears. She is driven with the winds of longing and failure. She looks upward, and seems to see light, but the darkness of trouble seizes her and pulls her back to a hard, hopeless

conflict. Can we give her a cry of hope, that at last the light above will conquer? Can we give her a cry of cheer, that love is the ruling power, a great unending love, so mighty that we cannot grasp it, but only rest in it? Can we go to this waiting world with our fresh, strong manhood, and tell her of God—the dear Father—who is back of all her battles and who can never leave her till she is redeemed and happy? Oh, happy are we if we can cry such a message as that! And we *can* if we are God's men ourselves. We can, if we are Christians.

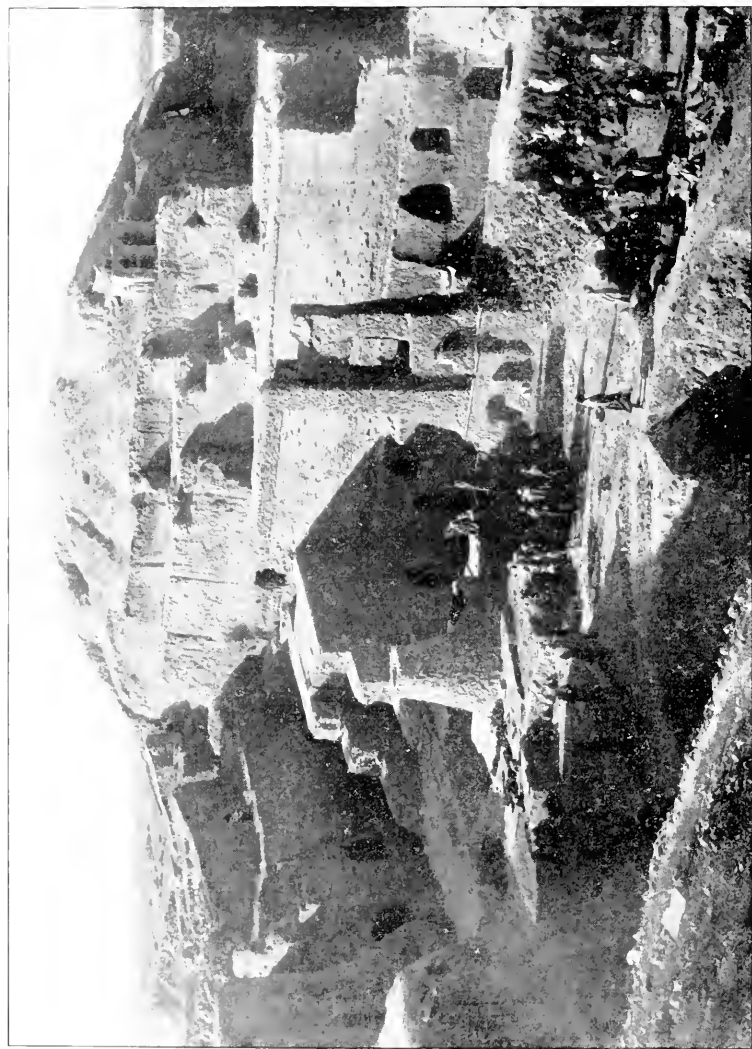
Such then is the cry which God sends us out to utter. There is no indefiniteness to it. It is clear, and clean and concise. It demands all our powers, all our consecrated talents, all our knowledge, all our great manly force and strength. Oh, if we would only give such a cry to the world! Oh, if from all our lives there should ring out such a message, how our country, and our social life, and our common life, and our religious life would soon become beautiful and divine! and then God's Kingdom would come!

Young men of the graduating classes: The world is before you; and God is above you. Have you a message from God for the world? In this solemn place, at this quiet hour in the midst of the anxieties and festivities of your graduation, God, your dear Father, asks you the question. To each one of you, as you stand upon the threshold of a new life, He speaks. "The voice says, cry;" what will you cry? The old world is waiting for you, as she has waited for generations of men, hoping in her longing for liberation that some new power may come and free her. It is pathetic—*pathetic*, the eagerness with which humanity looks to educated men for help; and while she looks, how often they pass on, "one to his farm, another to his merchandise," one to his profession, another to his business, with no thought of the great value, the great power of their lives. It has been called an age of

doubt. Dr. Van Dyke, in his wonderful book, "The Gospel for an Age of Doubt," so marks it. "An inevitable fate, seen through the gloom of falling night—that indeed is the aspect of life which the literature of doubt displays to us. A gray shadow of melancholy spreads over the questioning, uncertain, disillusioned age; languid sighs of weariness breathe from its salons and palaces. Bitter discontent mutters in its workshops and tenements." "Never, I believe," says Paul Desjardins, "have men been more universally sad than in the present time." But I would rather call it an age whose sadness is caused by disappointment. The world has faith enough, only no one shows her how to direct it. She educates her sons only to see them turn from her in selfish quest of gain. She speaks her problems only to see her wise ones grow gray with theorizing, while her struggles wax heavier and more bitter. "If men know," she cries, "oh why do they not turn back to me and heal me?" She has the right to wonder. She has the right to demand succor—else were education the most foolish and wicked mockery. What then? Ah, my friends, *this*—that we should go, that each one of you should go, with glad enthusiasm, with glowing love, with tender hands, to help and bless the world and make her better and happier. We must be like the Christ. "He was not blind, nor dull of heart to feel the troubles of life. The problem of inequality lay wide open before Him, but it did not agitate nor distract Him. He neither raved nor despaired. He was serene and sane.

"He saw life clearly, and He saw it whole." He looked through the problem to its true solution.

Shall it be so with you? God grant it may be! God grant that from the fresh impulse of your young, strong, pure educated characters there may sound a message, real, certain, clear, before which the old world shall flush with joy, and blossom with new hope. The voice says, cry: what will you cry? What shall be the message of your life?



The Mound at Nippur.

THE RECENT EXCAVATIONS OF THE UNIVERSITY AT NIPPUR.

By Professor H. V. Hilprecht.

In my last report, published in the *Bulletin*, January, 1899, I gave a brief review of the history of our new expedition to Babylonia from the day when I left Philadelphia (May 19, 1898) for Constantinople, in order to secure a firman, to the time when the first members of the staff arrived at Nippur. A large number of Arab workmen having been engaged at Hillah where all our tents, utensils and camp outfit had been stored for the last three years, it was decided to make the trip to Nippur by way of the Euphrates and the canal which connects the Affej swamps with the latter. In six sailing boats, later drawn by half-naked Arabs, Dr. Haynes and his party left for the ruins to be excavated, on February 1, arriving five days later at Nippur.

The Affej tribes, in whose territory the large mounds are situated, gave to the expedition a hearty welcome, accompanied by shooting, shouting, dancing and singing, evidently delighted to have the members of the expedition once more in their midst. Where formerly poverty and distrust of travelers and explorers ruled, a change had gradually taken place among the natives. In consequence of the comparatively great amount of money paid to Affej workmen in the trenches, and to their chief shaykhs for protection afforded to the party, and for milk, eggs, mutton, chickens and other provisions regularly furnished to our camp, the Arabs had learned to regard our work as extremely advantageous to their own interests. Also the hundreds of sick people, suffering principally from pulmonary diseases, typhoid and malarial fevers, who had received

help and comfort from us in the past years, had been our best agents among their relatives and friends in the different tribes.

As ten years ago, when we went to Nippur the first time, Haji Tarfa was commander-in-chief of all the Affej, with his residence at Sûq-el-Affej, a few miles to the southeast of Nippur. Surrounded by his minor shaykhs and other dignitaries of the El-Hamza tribes, he received our expedition-corps. The former arrangements with the two shaykhs, Hamid el-Birjud and Abud el-Hamid, were ratified and new pledges given for the security and welfare of our expedition, the supplying of guards and water (which had occasionally been stopped previously) being especially emphasized. Everything was soon arranged satisfactorily for the two contracting parties. Following the general Oriental custom, and desiring to show appreciation for the care with which the Arabs, during our absence, had guarded the expedition's stronghold—a mud castle erected on the plain half way between the ruins and the marshes—the members of the expedition prepared for their Affej hosts a great feast, at which plenty of mutton, boiled rice and thin barley cakes were eaten by some fifty Arabs. The old bond of friendship was thus cemented anew with “bread and salt.”

According to the latest news received, which is dated April 8, the general health of the camp is good. But the activity on the field was greatly interfered with during the past months by the serious illness of Mr. Geere, one of the architects, who contracted pleuro-pneumonia and typhoid fever in rapid succession immediately after his arrival in Bagdad, December, 1898. He had to be left in “the glorious city of the caliphs,” where he could have medical attendance and a certain amount of comfort. During all his illness and convalescence, which lasted over three months, he was nursed by the other architect, Mr. Fisher, of Philadelphia, a graduate of the Department of Archi-

ture at the University of Pennsylvania. They have not yet arrived at Nippur.

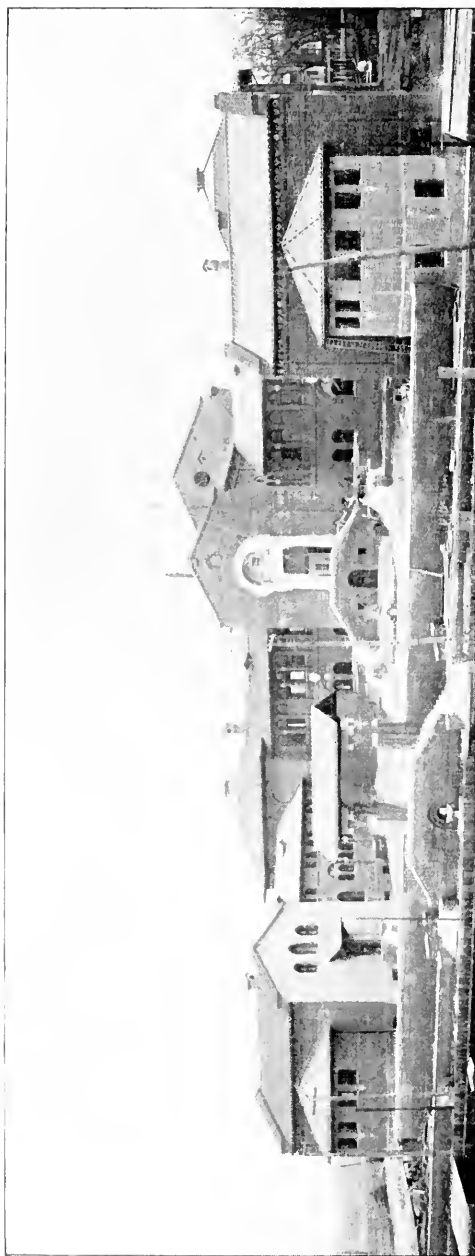
The actual excavations were begun on February 6, and were carried on in accordance with advices from the Philadelphia committee. Mr. E. W. Clark, chairman of the committee, who had eagerly watched and studied our past results, offered valuable suggestions. The present writer, acting as scientific director, was requested to prepare plans for the new campaign on the basis of his technical knowledge of the contents of the cuneiform inscriptions and the other finds, and his personal experience in the field. Following the instructions received from us, Mr. Haynes began to cut deep trenches into the southeastern mounds on the west side of the canal which divides Nippur into two nearly equal parts.

The results obtained during the first eight weeks of the excavation have fully realized our expectations. A long wall of an apparently important and very ancient structure built of kiln-burned bricks has been discovered and traced a distance of nearly five hundred feet, by a series of open trenches and tunnels at a considerable depth. The precise character of this wall and what it enclosed cannot be fixed, until I have received the technical report from the architects and squeezes of the inscriptions found in its neighborhood. On the level of the plain, twenty-three feet below the surface of the mounds, another arch of burned brick, and part of a water course, were excavated. One hundred and ninety-five tombs have been opened and examined. All the bones and skulls which allow of transportation were saved. Of the sarcophagi only such specimens will be removed as form an important link in the history of Babylonian burial customs, and which are valuable from an archæological standpoint, both the Imperial Ottoman Museum and our own University Museum having been supplied with the most representative types from the results of our last campaign. A large number of vases,

many nose-, ear-, finger-rings, anklets, bangles, bracelets, beads, etc., of silver, copper and stone were found in the tombs. A jar was discovered which contained miscellaneous coins and articles of jewelry, all belonging to the latest period of Babylonian history. Of especial value are ten bronze cups, bowls and mirrors, some of them of beautiful form and fine workmanship.

The most important find, however, from the rescued cuneiform tablets and other inscribed objects. Nearly fifteen hundred tablets and large fragments have so far been taken out of these newly-opened trenches. Apparently we have found another archive in the lower strata at a considerable depth below the present level of the plain. A large lump of earth, three and a half feet by one and a quarter feet, containing two layers of large unburned tablets, was brought in bulk to "the castle" to dry before they were extracted. Among the other remarkable objects which deserve notice to-day, seventeen seal cylinders, seven inscribed steles of baked clay and several fragments of a large burned clay cylinder may be mentioned. As stated above, I have not yet received squeezes of these objects to determine their age from their contents and paleographical evidence. From general indications and past experience I am inclined to assign the bulk of the tablets and the inscribed steles to the period 2500-1800 B. C.

The number of workmen at present employed in the trenches is two hundred and eight. As soon as the two architects have arrived it is our intention to have the search for the city gates, so successfully begun, rigorously continued. A considerable gang of Affej will then be dispatched to the temple hill on the eastern side of the Shatt-en-Nil to explore the lowest strata of the temple of Bel, which yielded the hundreds of small but important Old Babylonian vase fragments, from which I was enabled to restore the important texts of King Lugal-zaggisi and other powerful monarchs ruling in the fourth and fifth



New Museum Building.

pre-Christian millenniums. I have no doubt that in the course of our excavations we will find a considerable number of other fragments of large statues in diorite, of which we have found portions of shoulders, noses, ears, clasped hands, and even the whole trunk of a human being in two-third life size. They all belong to a period antedating 2800 B. C.

THE NEW MUSEUM BUILDINGS.

Some three years ago when the collections of the Department of Archæology of the University of Pennsylvania had grown to such dimensions as to make it evident that they could no longer be accommodated in the rooms which they then occupied in the University Library, a movement was set on foot by the late William Pepper, M. D., then president of the department, which resulted in obtaining from the State of Pennsylvania, and other subscribers, a sum of money sufficient to justify the preparation of plans for a suitable museum building. Ground to the extent of some nine acres had previously been given by the city of Philadelphia for museum purposes.

The committee charged with carrying the matter forward retained Messrs. Wilson Eyre, Jr., Cope & Stewardson and Frank Miles Day & Brother, as joint architects for the proposed museum.

The problem with which the architects were confronted, was the designing of a building which should afford a large exhibition area, accompanied by all necessary workrooms and administration rooms, in an entirely fireproof and permanent structure, at as small a cost as might be consistent with dignified results. It was necessary to plan the building in such a way that portions might be erected from time to time, each portion being complete in itself, and of such a nature as to present a

satisfactory appearance at any stage of the progress of the work. Such conditions made necessary, long study of the preliminary plan of the entire group of buildings. These studies, during the course of which many different general arrangements of the plan were developed, and many treatments of the exterior suggested, lasted for nearly a year. At last a definite plan was adopted, and working drawings and specifications were prepared for the first wing of the museum, a considerable portion of which has now been erected.

It will be seen that in the centre of the group, it is the intention to erect a dome which will dominate the entire composition. From this dome broad galleries extend, eastward and westward to two secondary domes, with each of which are connected two groups of buildings, one facing the north and the other facing the south. The portion at present erected, is the western group of buildings facing South street. The foundations of the western secondary dome have been put in place, and it is hoped that the dome itself may shortly be erected.

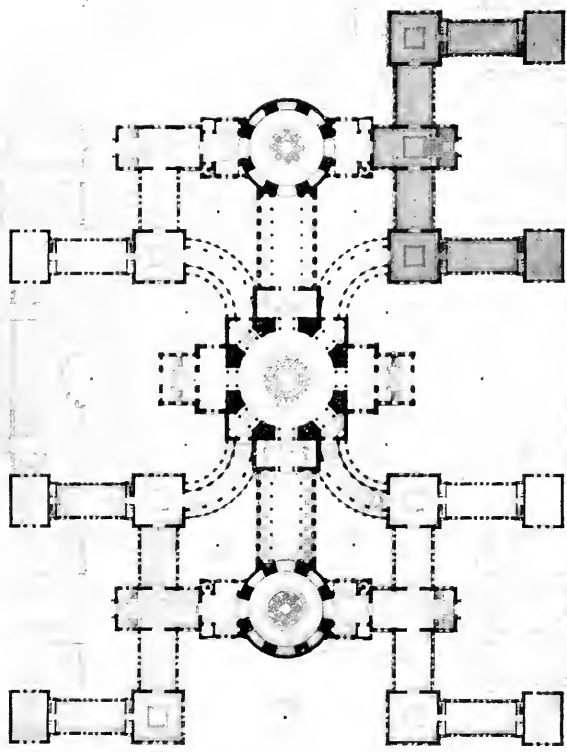
The portion at present complete, consists of buildings facing three sides of a quadrangle, in which are located a formal garden, with brick paths, trim hedges, stone benches, grass plots, etc., and a large pool for aquatic plants. The entrance to this garden is beneath a broad hooded gateway, which stands at the top of the steps leading from the street to the higher level. To the westward of the museum, and extending to Thirty-fourth street, are terraced grounds, also formally treated, in the centre of which will be placed the bronze statue of Dr. Pepper, recently completed by Mr. Carl Bitter, and presented to the University of Pennsylvania by friends of Dr. Pepper at the time of his resignation as Provost.

Entering the building through the quadrangle, one finds himself upon a spacious stairway landing, whence he may ascend to the second or principal exhibition floor, or descend to the first floor of the building.

FREE MUSEUM
OF
SCIENCE AND ART

DEPARTMENT OF
ARCHAEOLOGY AND PALEONTOLOGY
UNIVERSITY OF PENNSYLVANIA

WALL-SPACE
TO BE OBTAINED
FROM THE
EXISTING BUILDING



Free Museum of Science and Art. Ground Plan. (Shaded portion indicates part constructed.)

Upon the second floor he finds himself in the great central hall, in which will be displayed, objects illustrative of the countries bordering the Mediterranean. To the westward are two large rooms, devoted to the display of objects secured by the various University expeditions to Babylonia; while to the eastward are similar rooms, in which the Etruscan and Egyptian collections will be displayed. Upon the level of this floor are also rooms for administration, for curators, and for instruction. The first floor is almost entirely devoted to exhibition rooms. In the western wing, Professor Maxwell Sommerville's collection of objects connected with Buddhist worship, has been installed in the form of a temple, while in the next room, in the southwestern corner, will be displayed his valuable collections of engraved gems.

The large room adjoining will be devoted to the exhibition of Ethnological objects of Asiatic origin, while the central gallery of the first floor will contain objects from Central and South America.

To the eastward are rooms in which will be lodged collections illustrative of the life of the Colorado Cliff Dwellers, and other American aborigines. The extreme eastward corner room will be devoted to the collections which Dr. W. H. Furness, Dr. H. M. Hiller and Mr. Alfred C. Harrison, Jr., have recently brought from Borneo and adjacent islands. The room immediately to the north of this will be occupied by a splendid collection of musical instruments (presented to the University by Mrs. Frishmuth) and by Mrs. Drexel's collection of fans.

On the first floor there remain to be mentioned only the Library, a room 34 x 46 feet, extending through two stories in height and having a shelf capacity of 15,000 volumes; and the Lecture Room, occupying a corresponding position in the western wing, and having a seating capacity of about three hundred persons.

The entire ground floor is devoted to space for unpack-

ing, repairing, arranging and storing specimens. Here, are also the lavatories, shops, work rooms, janitor's quarters, restaurant for employes, etc., etc.

Examining again the exterior of the building, it is seen to be in that form of brick architecture which prevailed in the North of Italy from the twelfth to the fourteenth century. The building is of rough brick of somewhat unusual color, laid with extremely wide mortar joints, which give a vigorous, hardy character to the work. The external ornamentation consists chiefly of roughly executed mosaics, of fragments of brick and marble, somewhat similar to those in the walls of the old church of San Stefano in Bologna. The cove of the main cornice at the back of the courtyard is enriched with glass mosaics in conventional forms, and enlivened with figures of birds and animals. Comparatively little carved ornament has been used on the exterior of the buildings; and this is confined to some conventional animals forming the terminals of gables, to shields over the windows which are representative of the collections within, and to a panel over the main door executed by Mr. Calder, in which two youths are supporting a shield bearing as its inscription the name of the Museum. One of the features which contributes most to the external effect of the building is its simple roof of large heavy tiles of the so-called Spanish form.

The building is entirely fireproof in its construction. It is heated by steam, in some parts by direct and in others by indirect radiation. Its electrical equipment is complete, and includes lighting, telephones, burglar alarms, etc. The formal opening will take place early in the autumn of 1899.

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